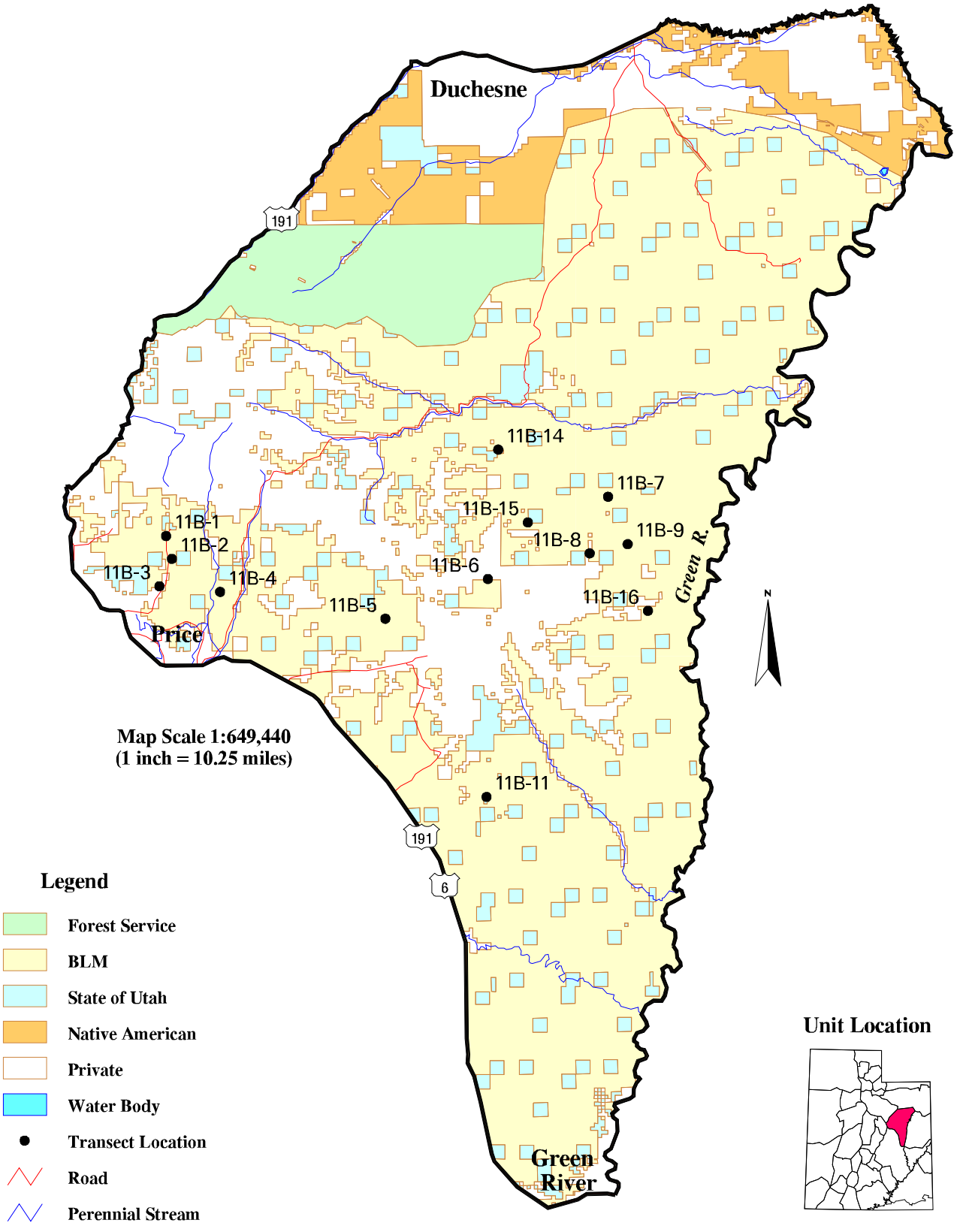
Management Unit 11B



WILDLIFE MANAGEMENT UNIT 11B (32) - ANTHRO/RANGE CREEK, RANGE CREEK

Boundary Description

Carbon, Utah, Duchesne, and Emery counties - Boundary begins in Green River and Interstate 70; then west on I-70 to highway US-6; northwest on US-6 to Highway US-191; northeast on US-191 to the Argyle Canyon road; southeast on the Argyle Canyon road to the Nine-mile Canyon road; east on the Nine-Mile Canyon road to its end near Bull Canyon; then continuing along Nine-Mile Creek to the Green River; south along the Green River to I-70 and beginning point.

Herd Unit Description

Unit 11B (32) contains the eastern portion of Carbon County, the northeastern part of Emery County, a southern piece of Duchesne County and small portions of Utah county. This triangular unit encompasses the West Tavaputs Plateau, bounded by the Book Cliffs and Soldier Canyon on the west, the Price River-Duchesne River drainage divide on the north and Green River on the east. Topography is steep and rough. The major drainages are: Nine-Mile Creek, which drains Minnie Maude, Dry, Argyle, Cow, and Harmon Canyons into the Green River; Range Creek, which drains the east side; and Pace, Whitmore and Horse Canyons. Elevation ranges from 4,064 feet at Green River to 10,285 feet on Bruin Point. Communities bordering the west side of the unit are Helper, Price, Wellington, Sunnyside, East Carbon, and Green River.

Normal winter range below the 8,500 foot elevation completely encompasses the summer range. Severe winter range is limited to areas below 7,000 feet. On the east side of the unit, steep bare slopes limit use to the ridge tops and canyon bottoms along lower Nine-Mile Creek and the Green River. During severe winters, all deer wintering in these areas are forced into the canyon bottoms, usually causing heavy winter losses. Along the west side of the unit, from Soldier Creek Canyon east to Horse Canyon, access to the winter range is good. However, from Horse Canyon south, the Roan and Book Cliffs drop off sharply presenting major obstacles to deer migration and preventing use of much of the lower elevation range. Winter concentration areas include: Nine-Mile Creek, Rock House Cow Camp area, Cedar Ridge, Argyle Canyon, and Little Park.

During the summer of 1966, Coles and Pederson (1967) inventoried the deer winter range on the Range Creek unit. The overstory types identified were: pinyon-juniper, covering 89% of the winter range, sagebrush (3%), greasewood (3%), seedings (2%), and agricultural land (2%). Although the most extensive, the pinyon-juniper type is the least productive. This type averages 327 lbs/forage/acre and has been heavily grazed historically. The sagebrush-rabbitbrush and sagebrush-grass associations have also been intensely grazed, but with production of respectively 942 lbs/acre and 381 lbs/acre, these can be very important vegetation types on the winter range. With an estimated 1,498 lbs/acre, the greasewood-grass type is the most productive on the unit. However, this type is restricted to only canyon bottoms and the valley floors, and receives greatest use only during severe winters. Coles and Pederson concluded that overall forage production on the unit (winter range) was low due to the nature of the land, soils and native vegetation, and also past grazing abuses.

The unit presents several challenges to public land and wildlife managers. Since 75% of the summer range is private land, hunting access is limited and may become more restricted unless hunters are willing to pay trespass fees. Some of the ranches are privately managed for trophy hunting.

Grazing Summary

All of the study sites on the Range Creek deer herd unit occur on lands administered by the BLM. The 16 study sites on the unit occur in 8 different allotments. Sites at Deadman (#1) and Airport Bench (#2) occur in the Coal Creek allotment which is grazed by 612 cows from April 15 to May 31 in a three pasture rest rotation

system. Some fall grazing also occurs as the cattle drift off the mountain. The Airport (#3) site occurs on the Hayes Wash allotment, a winter allotment, which is grazed by 61 cows for short periods between October 15 and May 31. Trend study #4, Coal Creek, is in the Soldier Canyon allotment which is also a winter allotment. Grazing occurs from November 1 to February 28 with 117 cows. Grazing is also permitted from March 1 to May 31. The study in B Canyon (#5) occurs within the Mud Springs allotment which utilizes a four pasture deferred rotation schedule to graze 338 cows from October 15 to June 15.

Study sites Upper Cottonwood (#6), Cottonwood (#7), Cedar Corral (#8), Cedar Ridge (#9), Twin Hollow (#15) and Steer Ridge (#16) occur in the large Green River allotment. It consists of 8 pastures in which grazing takes place on some pastures in the spring and other pastures in the summer. Site #10, Upper Cottonwood, is used in the summer from June 1 to October 31 by 900 cattle. The other study sites are used in the spring with grazing occurring from April 15 to May 31 by 500 cattle. This allotment has been closed to grazing since 1994. A large herd of wild horses also use this allotment.

Study sites at Upper Little Park Wash (#14), Little Park Exclosure (#15) and Williams Draw (#16) occur within the Little Park allotment which is grazed by 49 head of cattle from June 1 to October 31. Study site number 20, Prickly Pear, is in the Stone Cabin allotment which utilizes a four pasture deferred rotation schedule to graze 315 cows from May 1 to September 30. Grazing on the study area usually occurs in the spring.

Big Game Trends

The management objectives for the Range Creek portion of unit 11 are to maintain a wintering population of 6,000 deer with a herb composition of 15 bucks to 100 does. Thirty percent of these bucks are to be 3 point or better. Harvests have continually increased since the harsh winters of the mid 1980's when less than 400 bucks were harvested. Buck harvests ranged between 830 and 756 between 1988 and 1991 then dropped dramatically to 581 in 1992 and only 282 in 1993. This decline is due to the extremely harsh winter of 1992-93. The fawn/doe ratio has also declined from a high of 67 fawns/100 does in 1988-89 to only 34 in 1992-93. Numbers rebounded somewhat to 47 fawns/100 does in 1994-95, then dropped to only 25 in 1995-96. Wildlife management units Anthro and Range Creek were combined in 1998 into the Nine Mile management unit with the Anthro portion being subunit 11A and Range Creek subunit 11B. Fawn/doe ratios for the entire unit are currently moderately high at 74 fawns/100 does in 1997-98 and 69 in 1998-99.

Elk are present in the area in small but increasing numbers. Current management objectives are to maintain a winter herd size of 1,000 elk on the Range Creek sub unit with a herd composition of 8 bull to 100 cows. At least 4 of those bulls being 2 ½ years of age or older. Aerial counts in 1999 estimate 1,200 elk which is above the management objective (BLM 00).

There is a portion of what used to be the Icelander Wash antelope unit between the Book Cliffs and US Highway 6 which is now part of the Range Creek Wildlife Management unit. In 1972, 150 antelope were introduced to the area and then 165 more in 1982. Aerial counts have increased from 174 in 1977 to 1,022 in 1989 and 703 in 1995. Hunting was allowed in 1974 and permits have increased from 10 that year to 33 in 1994. In 1990, 49 buck permits and 76 doe-fawn permits were sold. Although only a small percentage of the herd is found east of Highway 6, that number is increasing with the rest of the herd. These increasing numbers of elk and antelope will necessitate continued monitoring of vegetative trend on the Range Creek unit.

Trend Study Site Establishment

Interagency Range Trend Studies were established on 16 sites within the Range Creek unit in June 1986. Of these, three were located on summer range and the remainder were placed on winter range. In 1994, three new winter range sites were added and four dropped after meetings with the BLM and Division managers. During the 2000 season, 13 of the remaining 15 sites were reread.

Trend Study 11B-1-00

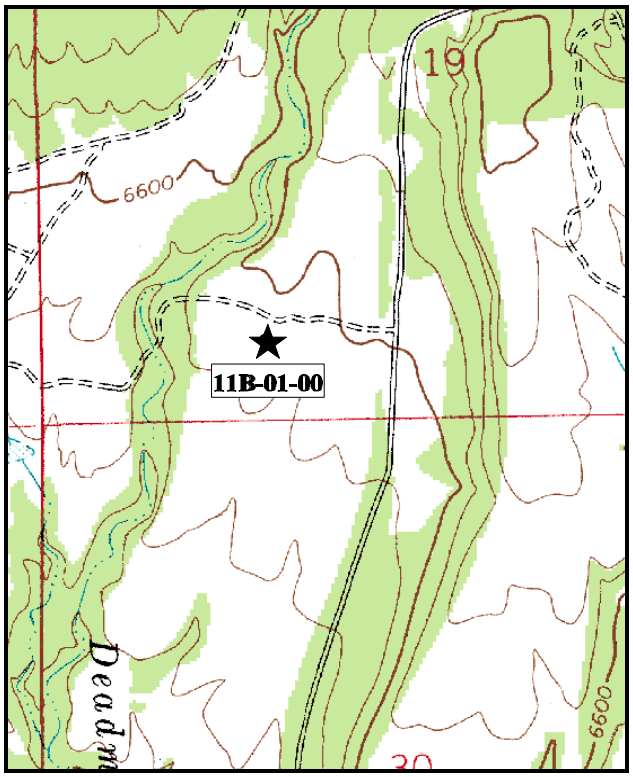
Study site name: Deadman . Range type: Chained, Cabled, Seeded P-J

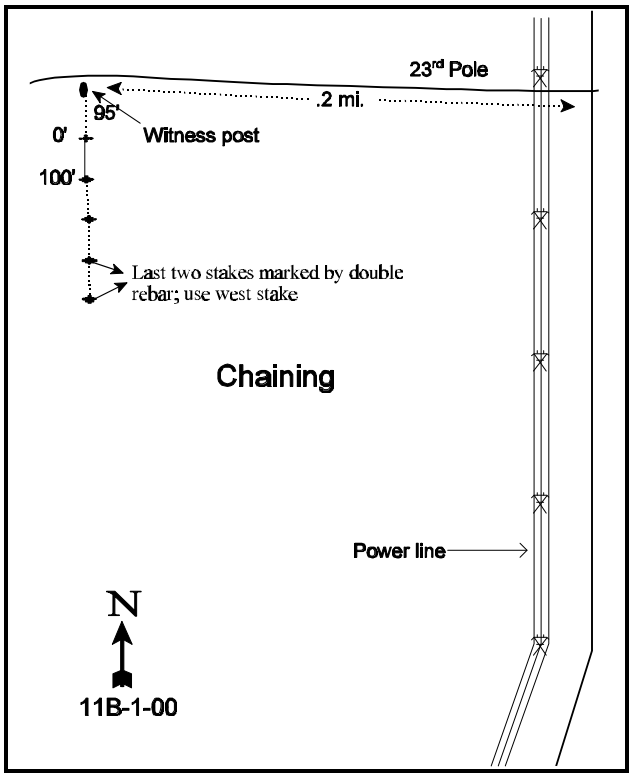
Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). Belt 1 rebar @ 1ft and belt 3 rebar @ 10 ft.

LOCATION DESCRIPTION

From the southeast end of Price, take the Airport Road east 3.1 miles to the airport. Continue 0.9 miles to a power line (and a left turn to the Airport transect). Proceed 0.45 miles to an intersection. Stay left on the main road for 1.15 miles to a corral and a fork to the right which leads to the Airport Bench transect. There is a bend in the power line on the left. Stay left and proceed up the main road another 1.7 miles (to the 23rd pole from the bend in the power line) and turn left. Proceed 0.2 miles, passing power pole #365, to a witness post (a green fence post with browse tag #7854) on the left side of the road in a chaining. The transect starts 95 feet south of the witness post. The transect is marked by rebar stakes, 1 to 2 ½ feet in height.





Map Name: Deadman Canyon

Diagrammatic Sketch

Township 13S , Range 11E , Section 19

UTM. 4391636.481 N, 522922.385 E

DISCUSSION

Trend Study No. 11B-1 (32-1)

Located near the mouth of Deadman Canyon, the Deadman trend study samples winter range on the bench lands northeast of Price and south of the Book Cliffs. Much of the area (managed by the BLM Price River Resource Area) was chained and seeded in 1965-66. Since the treatment, young surviving pinyon and juniper trees have resumed dominance of the area. Wood cutting (chained wood only) and Christmas tree cutting is allowed on the chained area. Human pressure is high with numerous roads making it very accessible. There is also activity associated with the coal mines located further up the canyon. This area lies within the Coal Creek allotment which is grazed by cattle from mid-April to the end of May and again during the month of October. Wildlife use appears to have declined since 1994. Quadrat frequency of deer and rabbit pellet groups was high in 1994 at 44% and 42% respectively, but numbers dropped dramatically in 2000 to 23% for rabbit and 15% for deer. A pellet group transect read on site in 2000 estimates only 19 deer use days/acre (47 ddu/ha).

The site elevation is 6,600 feet with a slope of 3% or less on a southern exposure. The study is near Deadman Creek, which only contains water seasonally. It drains south into the Price River. There is a fair amount of litter protecting the soil surface, much of it large persistent litter from the chaining. However, there are large areas of bare soil in the shrub and tree interspaces. Erosion does not appear to be a problem, even with large amounts of bare soil. Soil texture is a sandy loam with a mildly alkaline pH of 7.5. The soil appears moderately deep overall with an effective rooting depth estimated at almost 15 inches. Rock and pavement is common on the surface and within the profile with most of the rock concentrated in the upper 8 inches. Much of the rock contains a calcium carbonate coating and some areas have developed a weak hardpan at a depth of about 12 inches. There is also some exposed sandstone bed rock in the area. Phosphorus could be a limiting factor at only 4.3 ppm, as values less than 10 ppm may limit normal plant growth and development.

The most abundant key browse species is true mountain mahogany. It made up only 15% of the browse cover in 1994 and 12% in 2000 with an estimated density of 100 plants/acre in both 1994 and 2000. These plants have spread naturally into the area. The majority of the mountain mahogany encountered were vigorous mature plants that showed only light to moderate use in 1986 and 1994. However, use was heavy on 60% of the plants sampled in 2000. The tallest portions of these plants are growing out of reach of browsing animals, but their bushy growth habit provides good amounts of available forage. Important browse species that were seeded when the area was chained, include fourwing saltbush and bitterbrush. Individuals of these species are widely scattered and are mostly older plants. They don't appear to be reproducing as well as the mountain mahogany although the plants are vigorous and putting on good growth. A few Mountain big sagebrush occur in the area but no plants were sampled in the shrub density strips. Green ephedra is vigorous with an estimated density of 160 plants/acre in 2000. Use was very heavy in 2000 with 75% of the plants sampled showing heavy use. Vigor was also reduced on 13% of the population.

Broom snakeweed is the most abundant shrub on the site with a density that has increased from zero in 1984 to 760 plants/acre in 1994 and 9,380 plants/acre by 2000. Most of the population (87%) is mature, but young plants are common and the population may increase in the future. Pinyon and juniper dominate the overstory by providing 77% and 74% of the total browse cover in 1994 and 2000 respectively. There is evidence of light browsing on the juniper. Both the juniper and pinyon appear to be resuming their dominance of the site. Point-quarter data from 2000 estimate 104 pinyon and 183 juniper trees/acre with an average diameter of 3.6 and 2.1 inches respectively. Nearly all of the pinyon and juniper appear to have been released by the chaining. This area needs to be retreated to reduce the pinyon-juniper competition. Pinyon and juniper trees are still small enough to be treated by a roller-chop.

The seeding of crested wheatgrass established a fair stand. However plants are scattered in small patches, are small in stature, and only provided 5% cover in 1994 and 4% in 2000. The grass has been grazed heavily in the past but current ('00) use appears light.

A wide variety of forbs are found, although none provide significant forage. All forbs combined, on average provide less than 2% cover. Seeded alfalfa was encountered in 8 quadrats in 1986 but significantly declined in nested frequency by 1994. It was not sampled in 2000 and appears to be dying out due to the extended drought.

1986 APPARENT TREND ASSESSMENT

In terms of providing important winter forage for deer, this area appears to have an overall downward trend as pinyon and juniper increase in size. Much of the mountain mahogany has become unavailable due to height. Browse reproduction and variety are encouraging signs for this site to become good winter range. Management should strive to maintain the mountain mahogany and other browse species. Continued removal of the increasing pinyon-juniper with firewood and Christmas tree harvest is desirable. The soil is in good condition and trend appears stable.

1994 TREND ASSESSMENT

With the continuing drought, trend for soil is down with the increase in percent bare ground, a decrease in litter cover, and a significant decrease in crested wheatgrass. Key browse species are in low numbers, with the increaser broom snakeweed the most numerous shrub. However, the browse trend is stable to slightly improving. Trend for the herbaceous understory is slightly downward as the majority of the cover is contributed by crested wheatgrass which has decreased significantly in nested frequency since 1986.

TREND ASSESSMENT
soil - down (1)
browse - stable to slightly improving (4)
herbaceous understory - slightly downward (2)

2000 TREND ASSESSMENT

Trend for soil appears stable. Percent cover of bare ground increased slightly, but the ratio of bare soil to protective cover is almost unchanged. Relative cover of vegetation, litter and bare ground have remained similar between readings. There is some erosion occurring but it is minimized by the gentle terrain. Herbaceous vegetation is not abundant but sum of nested frequency of perennial grasses has remained similar to 1994. Trend for browse is down. Use of the preferred browse species, mountain mahogany, rubber rabbitbrush, and green ephedra is extremely high. In addition, percent decadency and plants with poor vigor has increased for rubber rabbitbrush and green ephedra, and density of the increaser broom snakeweed has exploded from 760 plants/acre in 1994 to 9,380 in 2000. Pinyon and juniper trees are also increasing in size and density. Point-quarter data from 2000 estimate 104 pinyon and 183 juniper trees/acre with an average diameter of 3.6 and 2.1 inches respectively. Nearly all of the pinyon and juniper trees appear to have been released by the chaining since only 5% of the trees sampled were surviving chained trees. These trees currently account for 55% of the total vegetative cover and produce 12% overhead canopy cover. Key browse species are low in number and without some sort of retreatment of the site to control pinyon and juniper, this area will no longer contain enough useful browse forage to be considered an important winter range. Trend for perennial grasses appears stable with similar sum of nested frequency values compared to 1994. Sum of nested frequency of perennial forbs has declined slightly but forbs were never very abundant. Overall, the herbaceous trend is considered stable but in poor condition. Herbaceous forage is limited with grasses and forbs combining to produce only 6% cover.

TREND ASSESSMENT
soil - stable (3)
browse - down (1)
herbaceous understory - stable (3), but in poor condition

HERBACEOUS TRENDS --
Herd unit 11B, Study no: 1

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
G	Agropyron cristatum	$_{b}$292	$_{a}$223	$_{a}$237	97	85	89	5.12	4.13
G	Aristida purpurea	-	4	1	-	2	1	.03	.15
G	Oryzopsis hymenoides	8	8	10	5	5	5	.08	.08
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		300	235	248	102	92	95	5.24	4.36
Total for Grasses		300	235	248	102	92	95	5.24	4.36
F	Arabis perennans	$_{b}$16	$_{a}$-	$_{a}$-	7	-	-	-	-
F	Astragalus convallarius	5	-	1	2	-	1	.00	.00
F	Chenopodium fremontii (a)	-	2	-	-	1	-	.00	-
F	Cryptantha fulvocanescens	43	44	51	21	21	25	.58	1.02
F	Descurainia pinnata (a)	-	$_{b}$5	$_{a}$-	-	3	-	.01	-
F	Eriogonum alatum	-	-	4	-	-	2	-	.01
F	Eriogonum umbellatum	19	16	15	8	8	7	.09	.13
F	Euphorbia spp.	$_{b}$80	$_{a}$24	$_{a}$30	35	10	17	.07	.11
F	Hedysarum boreale	5	-	-	3	-	-	-	-
F	Ipomopsis aggregata	$_{b}$3	$_{b}$8	$_{a}$-	3	3	-	.01	-
F	Lesquerella ludoviciana	$_{a}$-	$_{b}$21	$_{a}$2	-	11	1	.10	.00
F	Lithospermum multiflorum	2	2	-	1	1	-	.01	-
F	Machaeranthera canescens	$_{a}$-	$_{b}$20	$_{a}$1	-	10	1	.12	.00
F	Machaeranthera grindelioides	$_{ab}$4	$_{b}$5	$_{a}$-	2	3	-	.01	-
F	Medicago sativa	$_{b}$18	$_{b}$5	$_{a}$-	8	3	-	.04	-
F	Penstemon caespitosus	$_{a}$-	$_{b}$3	$_{a}$-	-	3	-	.01	-
F	Penstemon cyanocaulis	31	27	14	15	12	7	.16	.09
F	Salsola iberica (a)	-	$_{b}$77	$_{a}$-	-	26	-	.82	-
F	Sphaeralcea coccinea	$_{a}$5	$_{b}$20	$_{ab}$15	2	7	6	.11	.22
F	Townsendia incana	14	7	12	7	2	6	.01	.03
Total for Annual Forbs		0	84	0	0	30	0	0.84	0
Total for Perennial Forbs		245	202	145	114	94	73	1.36	1.64
Total for Forbs		245	286	145	114	124	73	2.21	1.64

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 11B, Study no: 1

Type	Species	Strip Frequency '94	Strip Frequency '00	Average Cover % '94	Average Cover % '00
B	Cercocarpus montanus	5	5	1.46	2.04
B	Chrysothamnus nauseosus albicaulis	0	7	-	.38
B	Chrysothamnus nauseosus hololeucus	5	0	.00	-
B	Ephedra viridis	4	6	.03	.18
B	Gutierrezia sarothrae	14	57	.45	1.75
B	Juniperus osteosperma	0	12	3.27	5.59
B	Opuntia spp.	5	5	.00	.03
B	Pinus edulis	0	8	4.42	7.23
B	Purshia tridentata	2	1	.38	.03
Total for Browse		35	101	10.03	17.25

CANOPY COVER --
Herd unit 11B, Study no: 1

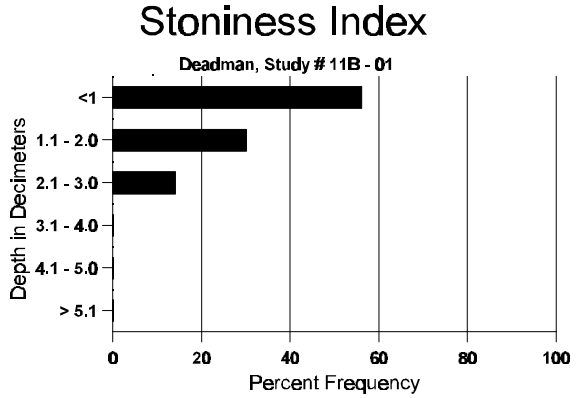
Species	Percent Cover '00
Juniperus osteosperma	5
Pinus edulis	7

BASIC COVER --
Herd unit 11B, Study no: 1

Cover Type	Nested Frequency '94	Nested Frequency '00	Average Cover % '86	Average Cover % '94	Average Cover % '00
Vegetation	285	271	6.25	17.24	25.72
Rock	282	186	2.25	8.81	9.61
Pavement	292	317	10.00	4.03	9.95
Litter	388	360	58.25	30.11	34.09
Cryptogams	6	13	0	.18	.13
Bare Ground	310	312	23.25	29.17	37.48

SOIL ANALYSIS DATA --
Herd Unit 11B, Study # 1, Study Name: Deadman

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
14.88	52.4 (14.09)	7.5	57.3	24.7	18.0	2.6	4.3	70.4	0.8



PELLET GROUP FREQUENCY --
Herd unit 11B, Study no: 1

Type	Quadrat Frequency		Pellet Transect	
			Pellet Groups per Acre	Days Use per Acre (ha)
	'94	'00	'00	'00
Sheep	-	1	18	N/A
Rabbit	44	23	26	N/A
Elk	5	-	-	-
Deer	42	15	244	19 (47)
Cattle	-	2	35	3 (7)

BROWSE CHARACTERISTICS --
Herd unit 11B, Study no: 1

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6	5	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	29	62	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			Dec:	
	'86	0		-
	'94	0		-
	'00	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Cercocarpus montanus																		
S	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	1	-	-	3	2	-	-	-	-	4	2	-	-	200	83	29	6
	94	2	2	-	1	-	-	-	-	-	5	-	-	-	100	59	78	5
	00	-	-	1	1	1	2	-	-	-	5	-	-	-	100	56	65	5

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	29%	00%	00%	-57%
'94	40%	00%	00%	+ 0%
'00	20%	60%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	233	Dec:	-
	'94	100		-
	'00	100		-

Chrysothamnus nauseosus hololeucus																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	1	-	-	-	-	-	-	1	-	-	-	20			1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	5	-	-	-	-	-	-	-	-	5	-	-	-	100	21	21	5
	00	-	1	2	-	-	-	-	-	-	3	-	-	-	60	24	12	3
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	1	-	-	-	1	-	-	1	-	-	2	60			3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	+29%
'00	14%	57%	29%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	0%
	'94	100		0%
	'00	140		43%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Ephedra viridis																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
	00	-	-	1	-	-	-	-	-	-	1	-	-	-	20			1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80	24	30	4
	00	-	-	2	1	1	1	-	-	-	5	-	-	-	100	31	35	5
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	1	-	-	1	-	-	-	1	-	1	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	-11%
'00	13%	75%	13%	

Total Plants/Acre (excluding Dead & Seedlings)				
'86	0	Dec:		0%
'94	180			0%
'00	160			25%

Gutierrezia sarothrae																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	00	6	-	-	-	-	-	-	-	-	6	-	-	-	120			6
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	43	-	-	-	-	-	-	-	-	43	-	-	-	860			43
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	37	-	-	-	-	-	-	-	-	37	-	-	-	740	8	8	37
	00	409	-	-	-	-	-	-	-	-	409	-	-	-	8180	6	5	409
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	17	-	-	-	-	-	-	-	-	12	-	-	5	340			17
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	180			9

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	+92%
'00	00%	00%	01%	

Total Plants/Acre (excluding Dead & Seedlings)				
'86	0	Dec:		0%
'94	760			0%
'00	9380			4%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Juniperus osteosperma																		
Y	86	3	-	-	-	-	-	-	-	-	3	-	-	-	100			3
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	9	-	-	-	-	-	-	-	-	9	-	-	-	180			9
M	86	-	-	-	-	2	1	-	-	-	3	-	-	-	100	122	67	3
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	4	-	-	-	-	-	-	-	-	4	-	-	-	80	-	-	4
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'86	33%	17%	00%
'94	00%	00%	00%
'00	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	200	Dec:	-
	'94	0		-
	'00	260		-

Opuntia spp.																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	6	-	-	-	-	-	-	-	-	6	-	-	-	120	3	13	6
	00	5	-	-	-	-	-	-	-	-	5	-	-	-	100	4	14	5
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	2	-	-	-	-	-	-	-	-	-	-	-	2	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'86	00%	00%	00%
'94	00%	00%	00%
'00	00%	00%	22%

%Change

+22%

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	0%
	'94	140		14%
	'00	180		22%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Pinus edulis																		
Y	86	2	-	-	-	-	-	-	-	-	2	-	-	-	66			2
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	3	-	-	-	-	-	-	-	-	3	-	-	-	100	59	48	3
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	2	-	-	6	-	-	-	-	-	8	-	-	-	160	-	-	8

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	166	Dec:	-
	'94	0		-
	'00	180		-

Purshia tridentata																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	2	-	1	-	-	-	-	-	3	-	-	-	60	6	12	3
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	33	72	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	67%	00%	00%	-67%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	60		-
	'00	20		-

Trend Study 11B-2-00

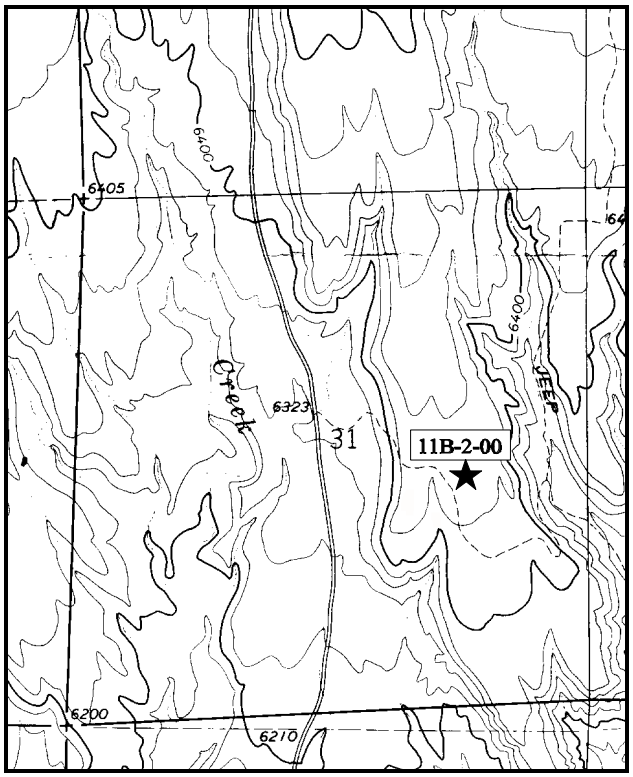
Study site name: Airport Bench . Range type: Chained, Cabled, Seeded P-J .

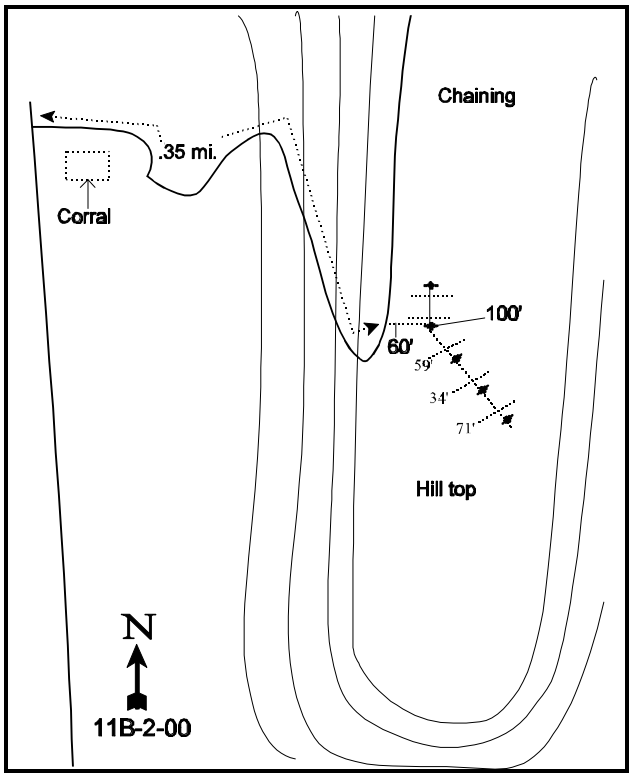
Compass bearing: frequency baseline 170°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (59ft), line 3 (34ft), line 4 (71ft). Belt 2 line 3 rebar @ 1ft.

LOCATION DESCRIPTION

Turn east on the Airport Road at the southeast end of Price and go 3.15 miles to the airport. After another 0.9 miles on the main road, you cross under a power line. Continue 0.45 miles to an intersection. Stay left. Go another 1.9 miles and turn right onto a dirt road just beyond a corral. Drive up this rocky road 0.35 miles to a fork on top of the bench. Bear left and go approximately 100 feet. The transect is in the chaining on the right side of the road. The 100-foot end of the baseline is 60 feet east of the road. All transect stakes are 1- to 2-foot tall fence posts.





Map Name: Deadman Canyon

Diagrammatic Sketch

Township 13S , Range llE , Section 31

UTM. 4389026.585 N, 523587.116 E

DISCUSSION

Trend Study No. 11B-2 (32-2)

The Airport Bench transect is located approximately two miles south of Deadman (11B-1) and shares many similarities. This bench was also part of the 1965 chaining and seeding project. As part of the same grazing allotment, management is similar except cattle use this area at a different time each year. Vegetative composition and condition parallels that of the Deadman study site except for the much higher cover value for pinyon-juniper on Deadman, 13% vs 9%. The site is slightly lower in elevation (6,400 feet). It is nearly level, although the bench top does slope slightly southward. As with site 11B-1, human pressure is high because of its proximity and easy access to Price. Evidence of human activity includes wood cutting, ORV tracks, abundant trashy litter, and shotgun shells were found. Deer pellet groups are common, but no antler drops or winter-killed deer were found during any reading. Quadrat frequency of deer pellet groups was high in 1994 at 60%, declining to 42% by 2000. Pellet group transect data taken parallel to the study site baseline in 2000 estimated 54 deer use days/acre (133 ddu/ha).

The soil is compacted, but appears to be fairly deep with an effective rooting depth estimated at 15 inches. It has a sandy clay loam texture with rock-pavement cover that has ranged from 13% to 15%. Rocks are also common throughout the soil profile. Soil phosphorous could be limiting at 6.3 ppm, where values less than 10 ppm may limit normal plant growth and development. Vegetative cover from crested wheatgrass combined with level terrain tends to limit erosion.

As previously mentioned, vegetative composition is quite similar to study 11B-1 but desirable browse forage is more limited here. Utah Juniper currently (‘00) provides 82% of the total browse cover. Trees average 8-10 feet in height. Point-quarter data from 2000 estimate 211 juniper and 97 pinyon trees/acre with an average diameter of 3.2 and 3.6 inches respectively. These trees also appear to have been released by the chaining since only 10% of the junipers sampled were tipped over surviving chained trees.

True mountain mahogany appeared fairly abundant in 1986 at an estimated 199 plants/acre. These were moderately hedged but vigorous. With the much larger sample size now used this clumped population was estimated at only 40 plants/acre in 1994 and no plants were encountered along the density strips in 2000. There are some tall mahogany plants scattered throughout the site which appear to be heavily hedged, but much of the forage is unavailable due to height. Bitterbrush (seeded) and green Ephedra are uncommon. Most of the bitterbrush seen in the surrounding area were heavily hedged in 2000. Use of ephedra is mostly light to moderate. The only abundant shrub on the site is broom snakeweed which has increased from 160 plants/acre in 1994 to 3,320 in 2000.

Crested wheatgrass dominates the herbaceous understory by providing 90% of the total grass cover in 1994, increasing to 99% by 2000. Cover of crested wheatgrass also increased from 6% in 1994 to 16% in 2000. There is also some Indian ricegrass and mutton bluegrass scattered throughout the understory. Perennial forbs are not very common and do not produce significant forage. However, the seeded alfalfa is still found on the site and it appears to be utilized where available. Most of the surviving plants are now growing under the protective cover of shrubs.

1986 APPARENT TREND ASSESSMENT

Although the site in many ways is similar to the Deadman transect, overall this area appears to be in a slightly worse condition with a downward trend. There are fewer desirable shrubs, mainly true mountain mahogany. Juniper and pinyon appear to be rapidly increasing. The lack of shrub reproduction may indicate a declining population due to increased competition with the pinyon and juniper. Mean annual precipitation would be less

at this lower site, as a result, the trees would have a greater competitive influence on understory composition. The soil trend appears stable.

1994 TREND ASSESSMENT

Comparing the data with 1986, the soil trend is down, as litter cover has declined and percent bare ground has increased substantially. This basic trend has been noted throughout the state because of the prolonged drought. The browse trend is stable to declining and in poor condition because of the low numbers of useful shrubs present. When the young pinyon and juniper trees become more mature they will have a strong negative effect on the understory browse. A treatment with a roller chopper would be timely and cost effective at this time. The herbaceous understory trend is down with significant decreases in crested wheatgrass nested frequency and a very high occurrence of annual Russian thistle throughout the understory. Together they make up 85% of the total herbaceous understory cover.

TREND ASSESSMENT
soil - down (1)
browse - stable to declining with little useful browse present (2)
herbaceous understory - down (1)

2000 TREND ASSESSMENT

Trend for soil appears to be slightly improved. Relative percent cover of bare ground has declined slightly while cover of litter and vegetation have increased. In addition, the dominant crested wheatgrass has increased significantly in nested frequency and it's cover has more than doubled. Erosion is minimal due to the level terrain combined with the abundant herbaceous cover. Trend for browse is down. The browse composition is poor with few useful shrubs present. Juniper currently provides 82% of the total browse cover and juniper and pinyon have increased in size and density since 1994. Cover has increased from 2% in 1994 to 9% in 2000. Overhead canopy cover is currently 4%. Broom snakeweed has increased in density from 160 plants/acre in 1994 to 3,320 by 2000. Trend for the herbaceous understory is up slightly due to an increase in the nested frequency of crested wheatgrass which currently provides 98% of the herbaceous cover. Sum of nested frequency of perennial forbs has declined. However, perennial forbs are limited and produce little useful forage.

TREND ASSESSMENT
soil - up slightly (4)
browse - down and in poor condition (1)
herbaceous understory - up slightly (4)

HERBACEOUS TRENDS --
Herd unit 11B, Study no: 2

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
G	Agropyron cristatum	$_{b}$302	$_{a}$240	$_{b}$298	98	88	98	6.41	16.37
G	Oryzopsis hymenoides	$_{a}$16	$_{b}$42	$_{ab}$28	7	16	12	.72	.11
G	Poa fendleriana	$_{b}$6	$_{a}$-	$_{a}$-	3	-	-	-	-
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		324	282	326	108	104	110	7.13	16.48
Total for Grasses		324	282	326	108	104	110	7.13	16.48
F	Cryptantha fulvocanescens	8	17	9	5	9	5	.21	.07
F	Descurainia pinnata (a)	-	$_{b}$11	$_{a}$-	-	6	-	.03	-
F	Eriogonum cernuum (a)	-	-	1	-	-	1	-	.00
F	Eriogonum ovalifolium	$_{a}$-	$_{b}$8	$_{a}$1	-	4	1	.07	.00
F	Eriogonum umbellatum	$_{b}$19	$_{b}$17	$_{a}$-	12	6	-	.03	-
F	Euphorbia spp.	$_{a}$10	$_{b}$24	$_{a}$9	5	13	4	.26	.04
F	Ipomopsis aggregata	-	1	-	-	1	-	.00	-
F	Lesquerella spp.	$_{a}$-	$_{ab}$6	$_{b}$14	-	2	6	.03	.03
F	Lithospermum incisum	2	7	4	1	5	2	.08	.03
F	Machaeranthera canescens	-	4	3	-	2	1	.04	.00
F	Medicago sativa	$_{b}$11	$_{ab}$9	$_{a}$2	4	4	1	.02	.03
F	Penstemon cyanocaulis	$_{a}$2	$_{b}$50	$_{a}$2	1	23	2	.34	.01
F	Salsola iberica (a)	$_{a}$-	$_{b}$263	$_{a}$4	-	84	1	5.12	.00
Total for Annual Forbs		0	274	5	0	90	2	5.15	0.00
Total for Perennial Forbs		52	143	44	28	69	22	1.10	0.23
Total for Forbs		52	417	49	28	159	24	6.26	0.24

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 11B, Study no: 2

Type	Species	Strip Frequency		Average Cover %	
		'94	'00	'94	'00
B	Atriplex canescens	0	1	-	.15
B	Cercocarpus montanus	2	0	.18	-
B	Chrysothamnus nauseosus	0	1	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	0	1	-	-
B	Ephedra viridis	2	2	-	.00
B	Gutierrezia sarothrae	2	31	-	.73
B	Juniperus osteosperma	0	11	1.77	8.03

Type	Species	Strip Frequency '94	Strip Frequency '00	Average Cover % '94	Average Cover % '00
B	Opuntia spp	1	1	-	-
B	Pinus edulis	0	1	-	.88
Total for Browse		7	49	1.95	9.80

CANOPY COVER --
Herd unit 11B, Study no: 2

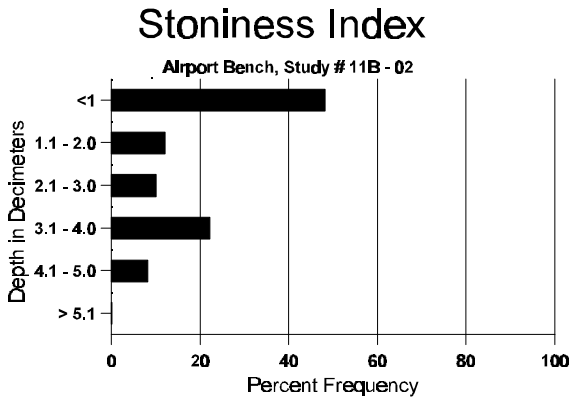
Species	Percent Cover '00
Juniperus osteosperma	4

BASIC COVER --
Herd unit 11B, Study no: 2

Cover Type	Nested Frequency '94	Nested Frequency '00	Average Cover % '86	Average Cover % '94	Average Cover % '00
Vegetation	338	310	14.00	14.85	26.38
Rock	308	131	5.25	7.11	3.84
Pavement	355	320	10.25	5.91	11.58
Litter	394	371	51.25	28.81	45.04
Cryptogams	-	8	0	0	.04
Bare Ground	347	298	19.25	24.90	23.78

SOIL ANALYSIS DATA --
Herd Unit 11B, Study # 2, Study Name: Airport Bench

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
15.01	52.4 (16.22)	7.5	54.0	22.0	24.0	3.9	6.3	147.2	0.7



PELLET GROUP FREQUENCY --
Herd unit 11B, Study no: 2

Type	Quadrat Frequency		Pellet Transect	
			Pellet Groups per Acre	Days Use per Acre (ha)
	'94	'00	'00	'00
Rabbit	58	30	218	N/A
Elk	3	-	-	-
Deer	60	42	705	55 (134)
Cattle	6	5	9	1 (2)

BROWSE CHARACTERISTICS --
Herd unit 11B, Study no: 2

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Atriplex canescens																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	1	-	-	-	-	1	-	-	-	20	22	46	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	100%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'86	0	Dec:		-
'94	0			-
'00	20			-

Cercocarpus montanus																		
Y	86	-	1	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	-	2	-	-	-	-	-	-	-	2	-	-	-	133	63	39	2
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40	46	45	2
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	60	71	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	100%	00%	00%	-80%
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'86	199	Dec:	-
'94	40		-
'00	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus nauseosus																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	22	21	0
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'86	00%	00%	00%
'94	00%	00%	00%
'00	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	0		-
	'00	80		-

Chrysothamnus viscidiflorus viscidiflorus

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	5	7	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'86	00%	00%	00%
'94	00%	00%	00%
'00	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	0		-
	'00	20		-

Echinocereus spp.

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6	18	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'86	00%	00%	00%
'94	00%	00%	00%
'00	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	0		-
	'00	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Ephedra viridis																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60	39	59	3
	00	-	1	-	3	-	-	-	-	-	4	-	-	-	80	32	48	4
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	-20%
'00	25%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'86	0	Dec:		0%
'94	100			20%
'00	80			0%

Gutierrezia sarothrae

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	10	-	-	-	-	-	-	-	-	10	-	-	-	200			10
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80	9	10	4
	00	158	-	-	-	-	-	-	-	-	158	-	-	-	3160	5	6	158
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
	00	7	-	-	-	-	-	-	-	-	2	-	-	5	140			7
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	300			15

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	+95%
'00	00%	00%	03%	

Total Plants/Acre (excluding Dead & Seedlings)				
'86	0	Dec:		0%
'94	160			50%
'00	3320			4%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Juniperus osteosperma																		
Y	86	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	3	-	-	2	-	-	-	-	-	4	-	1	-	100			5
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66	31	30	1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	3	-	-	1	-	-	2	-	-	6	-	-	-	120	-	-	6
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'86	00%	00%	00%
'94	00%	00%	00%
'00	00%	00%	08%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	199	Dec:	0%
	'94	0		0%
	'00	240		8%

Opuntia spp.																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	4	13	1
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40	4	18	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'86	00%	00%	00%
'94	00%	00%	00%
'00	00%	00%	00%

%Change

+50%

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	20		-
	'00	40		-

Pinus edulis																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66	87	70	1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'86	00%	00%	00%
'94	00%	00%	00%
'00	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	66	Dec:	-
	'94	0		-
	'00	20		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Purshia tridentata																		
M	86	2	1	-	-	-	-	-	-	-	3	-	-	-	200	31	45	3
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	26	47	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	24	69	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	33%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	200	Dec:	-
	'94	0		-
	'00	0		-

Trend Study 11B-3-00

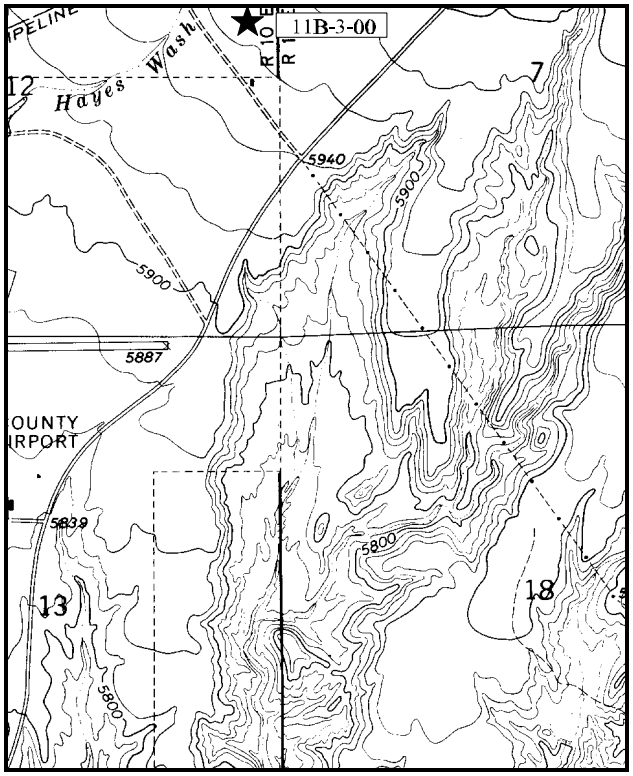
Study site name: Airport . Range type: Chained, Seeded P-J .

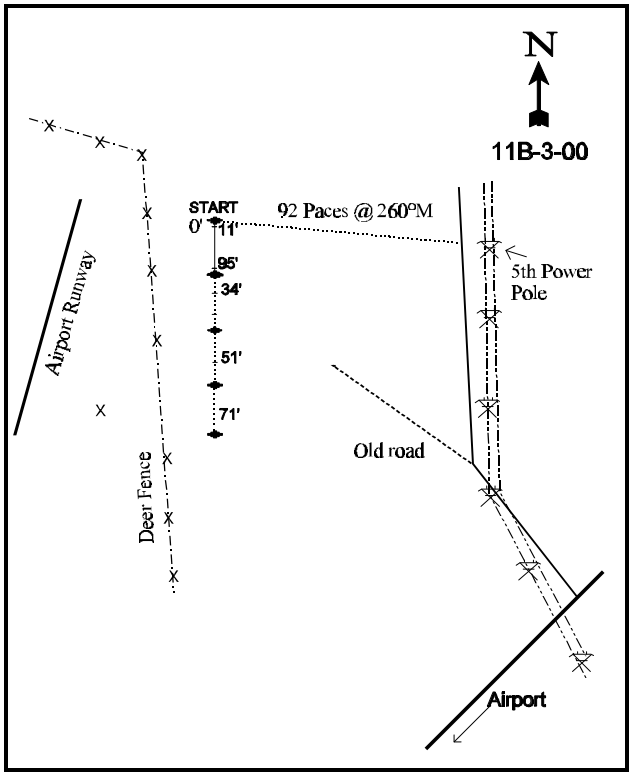
Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (51ft), line 4 (71ft).

LOCATION DESCRIPTION

From the intersection of Main Street and the Airport Road in Price, go 3.15 miles to the airport. Continue on the paved road 0.9 miles past the Carbon County Airport to a point where two power lines cross the road and there is a dirt road turning off to the left. Turn on this road and follow the power line 0.35 miles to the fifth wooden pole. Stop here. Walk west 92 paces @ 260°M to the start of the baseline, a rebar tagged #7891.





Map Name: Wellington

Diagrammatic Sketch

Township 14S , Range l0E , Section 12

UTM. 4385891.538 N, 522163.377 E

DISCUSSION

Trend Study No. 11B-3 (32-3)

The Airport transect is located on a sagebrush flat one mile north and slightly east of the Carbon County Airport. The large flat extends several miles north to the higher benches and mesas of the Book Cliffs. Elevation on the flat is 5,960 feet. Mature juniper stands border the east side. Originally a Wyoming big sagebrush flat with scattered Juniper, the area was chained and drill seeded with crested wheatgrass in 1965-66 by the BLM. Now the area supports a moderately low density of Wyoming big sagebrush with a crested wheatgrass understory. Sometime after the 1994 reading, the Carbon County Airport was expanded with a longer runway. A large deer fence now encloses the airport and is only about 300 feet west of the study site which may concentrate more deer use on the site. Quadrat frequency of deer pellet groups was quite low in 1994 at only 8%. In 2000, frequency increased to 22% which is still moderately low. A pellet group transect read along the baseline in 2000 estimated 23 deer days use/acre (57 ddu/ha). All of the deer pellet groups appear to be from winter use. As part of the Hayes Wash allotment, this area is grazed by 61 cattle from mid-October to the end of May. Utilization of the crested wheatgrass appeared to be moderate to heavy in 1986, but light in 2000 with only a few old cattle pats encountered.

The soil is moderately deep with an effective rooting depth of just over 14 inches. Depth is limited in some areas by a hardpan at about 7 inches in depth which could restrict the density of adult Wyoming sagebrush. The soil has a sandy clay loam texture with a slightly alkaline pH of 7.8. Organic matter is limited at only 1%, which is the lowest reading on the entire unit. Small gravel is common within the profile and concentrated on the surface, indicating soil loss in the past. Some of the gravel is coated with white calcium-carbonate. No gullies are evident. Rows of seeded crested wheatgrass are contoured to the slight slope which limits erosion and also helps the buildup of litter. Windrowed piles of juniper and sagebrush are remnants of the pre-treatment of the flat.

The site supports a moderate stand of Wyoming big sagebrush with just over 1,000 plants/acre estimated in 1986 and 1994, increasing to 2,280 plants/acre in 2000. Forty-seven percent of the plants sampled were decadent in 1986, but this has decreased to only 14% by 1994 and 11% in 2000. Recruitment in the form of seedlings and young is excellent. Currently, (‘00) 32% of the population consists of young plants, indicating an expanding population. Use of the sagebrush was extremely heavy in 1986 when 88% of the plants sampled were heavily hedged. On some plants, the new growth was short and unavailable due to the clubbed aspect of the plant. Use was much lighter in 1994, with only 2% of the sagebrush displaying heavy use. During the 2000 reading, use was mostly light to moderate with only 4% of the plants sampled displaying heavy use. Some sagebrush on this site display characteristics of black sagebrush (*Artemisia nova*), and mountain big sagebrush (*Artemisia tridentata vaseyana*). There is obviously some hybridizing occurring between the sagebrush subspecies. Plants with the heaviest use appeared to have more characteristics of mountain big sagebrush which is the most palatable of the sagebrush subspecies.

Other preferred browse plants include a few green ephedra and fourwing saltbush. Broom snakeweed is the most numerous shrub on the site, and similar to other trend sites in the area, it has increased in density. Density was estimated at only 266 plants/acre in 1986 which increased to 420 by 1994. Currently (‘00), the population has exploded to 8,940 plants/acre. Most of the plants (98%) are mature and decadent so it does not appear that the population will continue to increase in the immediate future.

Crested wheatgrass completely dominates the herbaceous component by providing almost 100% of the herbaceous understory cover. Although seeded 20 years ago, the plants are still confined mainly to the drill rows. Other grass species are uncommon. Forbs are limited and provide little forage except possibly during a wet, favorable spring. The only common species is scarlet globemallow.

1986 APPARENT TREND ASSESSMENT

Past grazing management has maintained the crested wheatgrass which appears to have a stable trend. Although somewhat heavily used and putting on minimal growth, the sagebrush is reproducing and doing fairly well for such a low rainfall area (annual average of about 11 inches in Price). Therefore, the range trend appears stable, although continued heavy use of sagebrush could lead to a downward trend in terms of deer winter range. The soil is fairly well protected and the site is level so soil loss is not a major concern. Soil trend also appears to be stable.

1994 TREND ASSESSMENT

The soil trend is slightly down because of the loss of much of the litter cover and the increased percentage of bare ground. Again, this trend has been noted throughout much of Utah especially at the lower elevation sites with the prolonged drought we have been experiencing since the late 1980's. This will turn around with near normal precipitation patterns. The browse trend, especially for the sagebrush, is up with decreases in those classified with moderate to heavy use (88% to 2%), decreased decadency (47% to 14%), increase in density, and an increase in seedling recruitment (12% to 46%). Trend for the herbaceous understory is stable. The forb component for the herbaceous understory is almost nonexistent but nested frequency of scarlet globemallow has increased.

TREND ASSESSMENT
soil - slightly down (2)
browse - up (5)
herbaceous understory - stable (3)

2000 TREND ASSESSMENT

Trend for soil appears to be slightly down due to an increase in cover of bare ground and a continued decline in litter cover. Litter cover has been declining steadily since 1986, mostly due to the decomposition of chaining litter. Bare ground has increased with each reading and is now high at 47%. On the positive side, erosion does not appear to be a problem due to the gentle terrain and the abundance of crested wheatgrass which has remained stable since 1986. The browse trend continues to improve with density increasing by 51% since 1994 and percent decadency declining from 14% to 11%. Young plant recruitment has increased from 16% to 32%. Use is mostly light to moderate and vigor good. The only negative aspect of the browse trend is the more than 4-fold increase in broom snakeweed density (420 to 8,940 plants/acre). Most of the population consists of mature and decadent plants so it does not appear that this population will continue to increase in the immediate future. The herbaceous trend appears stable with nested frequency of crested wheatgrass remaining stable. Forbs are still rare except for scarlet globemallow.

TREND ASSESSMENT
soil - slightly down (2)
browse - up (5)
herbaceous understory - stable (3)

HERBACEOUS TRENDS --
Herd unit 11B, Study no: 3

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
G	Agropyron cristatum	298	289	301	98	98	94	15.34	16.43
G	Agropyron dasystachyum	-	-	3	-	-	2	-	.01
G	Agropyron smithii	$_{b}$7	$_{a}$-	$_{ab}$-	3	-	-	-	-
G	Agropyron trachycaulum	$_{b}$5	$_{a}$-	$_{a}$-	3	-	-	-	-
G	Oryzopsis hymenoides	1	-	-	1	-	-	-	-
G	Poa secunda	-	1	-	-	1	-	.00	-
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		311	290	304	105	99	96	15.34	16.44
Total for Grasses		311	290	304	105	99	96	15.34	16.44
F	Astragalus convallarius	1	-	5	1	-	2	-	.23
F	Eriogonum ovalifolium	-	1	-	-	1	-	.00	-
F	Leucelene ericoides	-	-	3	-	-	1	-	.00
F	Lepidium spp. (a)	-	-	-	-	-	-	-	-
F	Orobanche fasciculata	-	-	1	-	-	1	-	.00
F	Sphaeralcea coccinea	50	79	65	25	31	27	.50	1.23
F	Thermopsis montana	-	-	4	-	-	1	-	.15
Total for Annual Forbs		0	0	0	0	0	0	0	0
Total for Perennial Forbs		51	80	78	26	32	32	0.50	1.63
Total for Forbs		51	80	78	26	32	32	0.50	1.63

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 11B, Study no: 3

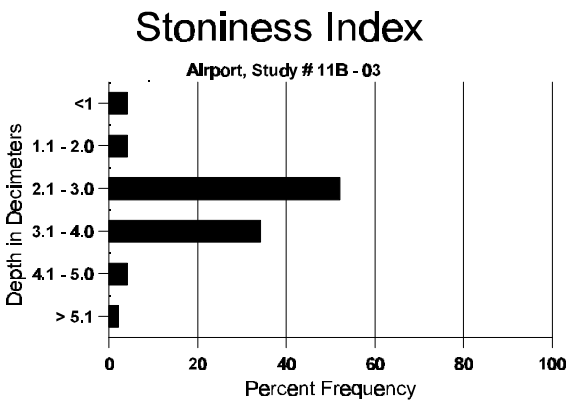
Type	Species	Strip Frequency		Average Cover %	
		'94	'00	'94	'00
B	Artemisia tridentata wyomingensis	32	49	4.21	5.21
B	Atriplex canescens	1	1	.03	.03
B	Chrysothamnus viscidiflorus stenophyllus	4	0	.15	-
B	Ephedra viridis	1	1	.38	.03
B	Gutierrezia sarothrae	11	54	.52	2.72
B	Opuntia polyacantha	10	8	.00	.03
Total for Browse		59	113	5.30	8.03

BASIC COVER --
Herd unit 11B, Study no: 3

Cover Type	Nested Frequency		Average Cover %		
	'94	'00	'86	'94	'00
Vegetation	306	324	3.25	21.21	27.20
Rock	325	50	.50	5.38	.18
Pavement	358	354	18.00	5.61	9.19
Litter	384	347	50.75	15.90	14.14
Cryptogams	14	73	0	.11	1.45
Bare Ground	355	367	27.50	31.23	47.47

SOIL ANALYSIS DATA --
Herd Unit 11B, Study # 3, Study Name: Airport

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
14.17	55.8 (13.54)	7.8	59.6	19.8	20.6	1.0	7.5	291.2	0.6



PELLET GROUP FREQUENCY --
Herd unit 11B, Study no: 3

Type	Quadrat Frequency		Pellet Transect	
	'94	'00	Pellet Groups per Acre '00	Days Use per Acre (ha) '00
Rabbit	50	73	687	N/A
Elk	1	1	-	-
Deer	8	22	305	24 (58)
Cattle	4	10	17	2 (4)

BROWSE CHARACTERISTICS --
Herd unit 11B, Study no: 3

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
S	86	2	2	-	-	-	-	-	-	-	4	-	-	-	133			4
	94	26	-	-	-	-	-	-	-	-	26	-	-	-	520			26
	00	12	-	-	-	-	-	-	-	-	12	-	-	-	240			12
Y	86	2	1	4	-	-	-	-	-	-	7	-	-	-	233			7
	94	6	-	-	-	-	-	-	-	-	6	-	-	-	180			9
	00	35	-	-	2	-	-	-	-	-	37	-	-	-	740			37
M	86	-	1	9	-	-	-	-	-	-	10	-	-	-	333	18	22	10
	94	35	-	-	-	-	-	-	-	-	35	-	-	-	780	22	34	39
	00	37	26	2	-	-	-	-	-	-	65	-	-	-	1300	18	23	65
D	86	-	-	13	-	-	2	-	-	-	15	-	-	-	500			15
	94	7	-	1	-	-	-	-	-	-	6	-	-	2	160			8
	00	2	5	2	2	1	-	-	-	-	7	-	-	5	240			12
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	220			11
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	340			17

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	06%	88%	00%	+ 5%
'94	00%	02%	04%	+51%
'00	28%	04%	04%	

Total Plants/Acre (excluding Dead & Seedlings)				
'86	1066	Dec:		47%
'94	1120			14%
'00	2280			11%

Atriplex canescens																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	44	63	1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	44	56	0
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	1	-	-	-	-	1	-	-	-	20			1
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	+ 0%
'00	100%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'86	0	Dec:		0%
'94	20			0%
'00	20			100%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus stenophyllus																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	4	-	-	1	-	-	-	-	-	5	-	-	-	100	6	12	5
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	86	-	-	3	-	-	-	-	-	-	3	-	-	-	100			3
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	100%	00%	+ 0%
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'86	100	Dec:	100%	
'94	100		0%	
'00	0		0%	

Ephedra viridis																		
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	1	1	1	-	-	-	-	-	-	3	-	-	-	100	17	6	3
	94	11	-	-	-	-	-	-	-	-	11	-	-	-	220	24	31	11
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	1	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	25%	25%	00%	+40%
'94	00%	00%	00%	-91%
'00	00%	100%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'86	133	Dec:	0%
'94	220		0%
'00	20		100%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	3	-	3	-	-	-	-	-	-	6	-	-	-	120			6
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	7	-	2	-	-	-	-	-	-	9	-	-	-	180			9
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33	6	4	1
	94	21	-	-	-	-	-	-	-	-	21	-	-	-	420	9	11	21
	00	365	-	-	-	-	-	-	-	-	365	-	-	-	7300	7	12	365
D	86	6	-	-	-	-	-	-	-	-	6	-	-	-	200			6
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	72	-	-	-	-	-	1	-	-	14	-	-	59	1460			73
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	100			5

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	+37%
'00	00%	.44%	13%	+95%

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	266	Dec:	75%
	'94	420		0%
	'00	8940		16%

Juniperus osteosperma

X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	0		-
	'00	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia polyacantha																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	33			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	7	-	-	-	-	-	-	-	-	7	-	-	-	233	4	6	7
	94	12	-	-	-	-	-	-	-	-	12	-	-	-	240	3	15	12
	00	11	-	-	-	-	-	-	-	-	11	-	-	-	220	3	6	11
D	86	5	-	-	-	-	-	-	-	-	-	-	5	-	166			5
	94	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
	00	1	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	38%	-40%
'94	00%	00%	08%	- 8%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	432	Dec:	38%
	'94	260		8%
	'00	240		8%

Trend Study 11B-4-00

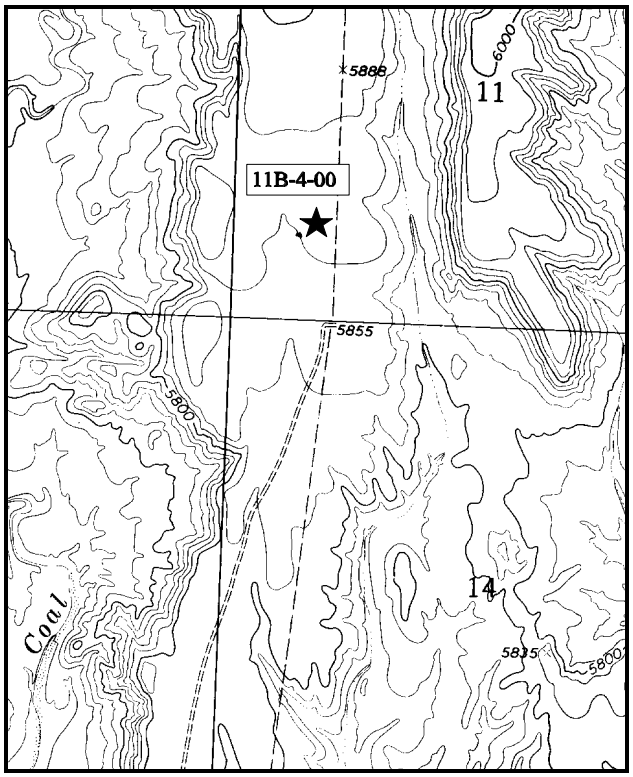
Study site name: Coal Creek . Range type: Big Sagebrush .

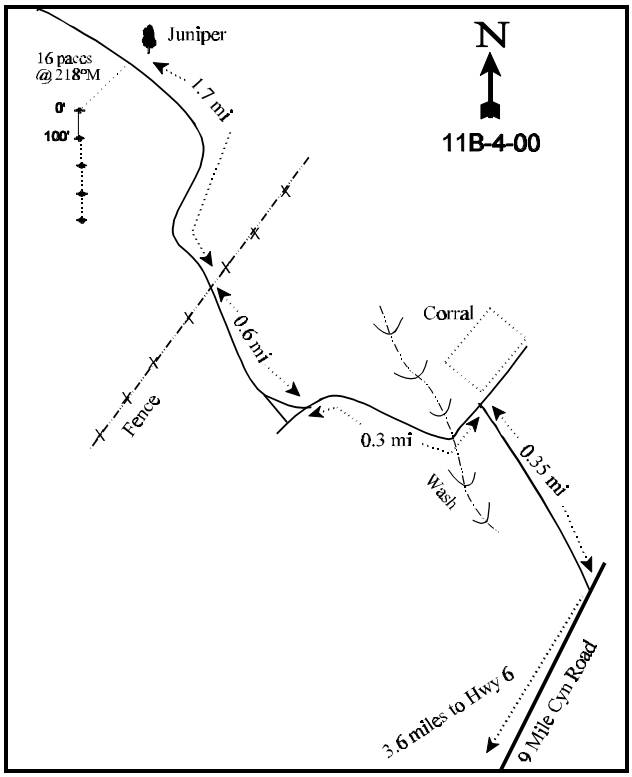
Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From Highway 6 east of Wellington, turn northeast on the Soldier Creek Road (9 Mile Canyon). Stay on this road 3.6 miles, then turn left onto a dirt road. Go 0.35 miles up to a fork near a corral. From the fork proceed 0.3 miles to another fork. Turn right and continue 0.6 miles to a wire gate. Go through the gate and drive 1.7 miles to a small Juniper 20 feet to the right of the road. The transect baseline starts 16 paces from the juniper on a bearing of 165°M. There is a browse tag #7839 on the 0-foot baseline stake.





Map Name: Wellington Diagrammatic Sketch

Township 14S ,Range 11 , Section 11 UTM. 4385891.538 N, 529106.094 E

DISCUSSION

Trend Study No. 11B-4 (32-4)

The Coal Creek study is in an open sagebrush flat about four miles from the Book Cliffs on top of a long, narrow, south-sloping plateau at an elevation of 5,860 feet. The area is managed by the BLM as part of the Soldier Canyon allotment. It is grazed by cattle in winter and again in late spring. Permitted numbers are for 117 cattle mid-November through February and 125 cattle March to mid-June. Sign of cattle use was infrequent on this particular site in 1986 and deer pellet groups were encountered only occasionally. A pellet group transect located further up Coal Creek (elevation 6,300) is the lowest elevation pellet group transect in the unit. In the past, it has consistently shown the highest use of any area sampled in the herd unit. Deer days use/acre averaged 44 (109 ddu/ha) between 1981-82 and 1990-91. Numbers dropped considerably in 1991-92 to only 23 ddu/acre (58 ddu/ha) and have averaged only 17 deer days use/acre (41 ddu/ha) between 1991-92 and 1995-96. Numbers are usually higher in hard winters as the deer inevitably move to the lower elevations those years even though thermal cover is limited on the plateau. It does not appear that this study area is still being used by significant numbers of deer or elk since 1986. Quadrat frequency of deer pellet groups was only 15% in 1994 declining to 3% in 2000. A pellet group transect read parallel to the trend site baseline in 2000 estimates only 4 deer days use/acre (10 ddu/ha). These low numbers may be partly due to the mild winter conditions of the past several years. Rabbits appear to be abundant on the site with numerous pellets and trails. They appear to be heavily utilizing shadscale, prickly phlox, and narrowleaf low rabbitbrush.

The soil is moderately deep but compacted. It has a sandy clay loam texture with a soil reaction that is slightly alkaline (7.5 pH). Organic matter is low at only 1%, which ties this site with Airport (#3) as the lowest sites on unit 11 with respect to soil organic matter. Phosphorus is also low at just 6.4 ppm, where values less than 10 ppm may limit normal plant growth and development. Due to the compaction of the soil, effective rooting depth is estimated at just over 13 inches. There is abundant pavement on the surface in exposed areas but little rock within the soil profile. Vegetative and litter cover are both low, yet erosion is minimized due to the level terrain. Although localized soil loss is evident by soil pedestaling under shrubs.

Wyoming big sagebrush dominates the plateau by providing 66% of the total vegetation cover in 1994 and 69% in 2000. It has steadily increased in density from 1,866 plants/acre in 1986, to 2,900 in 1994, and 5,560 by 2000. Vigor has remained good and percent decadence steady, ranging from 21% in 1986 to 24% in 1994. Recruitment in the form of seedlings and young are currently (‘00) excellent. The population in 1986 was heavily used with 29% of the shrubs classified as heavily browsed. Annual growth has been minimal, with any browsing causing them to appear they have been heavily hedged and clubbed in appearance. Use in 1994 and 2000 was mostly light with a few plants showing moderate and heavy use. Two desirable shrubs, winterfat and shadscale, occur at fairly low densities and are mostly decadent and over-utilized. Rabbits appear to be using these low growing shrubs. Density of shadscale has remained fairly stable since 1994, but winterfat has declined to the point that it was not sampled in 2000.

Composition in terms of numbers shows that broom snakeweed is by far the most numerous with 11,465 plants/acre estimated in 1986 and 6,280 in 1994. However, currently even with the great increase, they only make up 19% of the total browse cover. Density exploded in 2000 to an estimated 26,900 plants/acre. These individuals are quite small but are vigorous and virtually unutilized. Other invaders and possible indicators of range deterioration are pricklypear cactus and narrowleaf low rabbitbrush. Both have remained at a stable density since 1986.

Grasses and forbs are lacking on the site. Grasses currently (‘00) provide only 4% cover with forbs accounting for less than ½ of 1%. There are some small open areas of perennial grasses, but these have been invaded by broom snakeweed. The most common grass species are galleta, bottlebrush squirreltail, needle-and-thread, red

three-awn, and blue grama. Since most of the production is from warm season grasses, the value for spring use is limited. The forb composition is poor.

1986 APPARENT TREND ASSESSMENT

There are a large number of undesirable invader species on this site. Although they indicate a less than optimal range condition, they do not necessarily indicate a future downward trend. However, the hedged form of the Wyoming big sagebrush could indicate a downward trend. An encouraging sign is the presence of young sagebrush. Actually, the area appears more to be recovering from past abuses and with favorable conditions may continue to produce a large amount of winter range forage. Not much can be done to protect the scarce, more palatable shrubs from overuse. Because of inadequate ground cover, presence of erosion pavement, and lack of organic matter, the soil trend appears to be declining.

1994 TREND ASSESSMENT

With the lack of significant slope and percent bare ground changing little, trend for the soils is considered stable but in less than satisfactory condition. Even though the key browse species, Wyoming big sagebrush, has more plants that are now judged as decadent, this is more than compensated for by the exceptionally high biotic potential (# of seedlings) of 99%. Both shadscale and winterfat have greatly improved vigor and much lower rates of decadency. Trend for key browse is up, but the broom snakeweed population should be watched closely for any unusual increases in it's population. The trend for the herbaceous understory is slightly up, but still in very poor condition with a total of just 3% cover for all species combined.

TREND ASSESSMENT
soil - stable (3)
browse - up (5)
herbaceous understory - slightly up, but still poor (4)

2000 TREND ASSESSMENT

Trend for soil appears stable but still in poor condition with the ratio of bare ground to protective cover remaining unchanged. Litter and total vegetation cover are low while unprotected bare ground is high and herbaceous vegetation scarce. Interspaces between shrubs contain abundant erosion pavement while soil is pedestaled under the shrubs. Cryptogamic cover has increased but these are concentrated under shrub canopies. There is obviously some localized soil erosion occurring during high intensity storms but it is minimized by the level terrain. Trend for browse is up for the key species Wyoming big sagebrush. Density has increased due to a large number of young plants counted this year. Seedlings are also abundant. The number of decadent plants has increased (700 to 1,240 plants/acre) but this is more than compensated by the large number of young. Use is mostly light and vigor good. Rabbits appear to be heavily utilizing the other preferred browse shadscale. It appears to have a stable population but vigor is poor and percent decadence high. One negative aspect of the browse trend is the dramatic 4-fold increase in density of broom snakeweed since 1994 (6,280 plants/acre to 26,900). Trend for the herbaceous understory is up slightly but grasses and forbs are still lacking. Combined, they provide only 4% total cover. Grasses are diverse and sum of nested frequency for the most abundant grasses increased slightly. Sum of nested frequency of forbs declined.

TREND ASSESSMENT
soil - stable but in poor condition (3)
browse - up for Wyoming big sagebrush (5)
herbaceous understory - slightly up, but still poor (4)

HERBACEOUS TRENDS --
Herd unit 11B, Study no: 4

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
G	Aristida purpurea	$_{a}$-	$_{b}$10	$_{b}$7	-	5	4	.08	.16
G	Bouteloua gracilis	$_{a}$17	$_{b}$41	$_{c}$65	8	18	26	1.04	1.86
G	Hilaria jamesii	$_{a}$-	$_{b}$34	$_{a}$5	-	12	2	.66	.18
G	Oryzopsis hymenoides	$_{a}$-	$_{b}$9	$_{b}$15	-	5	8	.03	.44
G	Poa fendleriana	$_{a}$-	$_{b}$3	$_{a}$-	-	3	-	.01	-
G	Sitanion hystrix	$_{a}$28	$_{a}$16	$_{b}$65	12	6	28	.20	.81
G	Stipa comata	$_{a}$1	$_{a}$14	$_{b}$31	1	7	12	.57	.77
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		46	127	188	21	56	80	2.61	4.23
Total for Grasses		46	127	188	21	56	80	2.61	4.23
F	Astragalus convallarius	-	2	-	-	1	-	.00	-
F	Cruciferae	-	3	-	-	1	-	.03	-
F	Cryptantha spp.	-	4	-	-	1	-	.15	-
F	Eriogonum cernuum (a)	-	2	-	-	1	-	.00	-
F	Eriogonum ovalifolium	$_{a}$-	$_{b}$3	$_{ab}$1	-	3	1	.01	.00
F	Lappula occidentalis (a)	-	$_{b}$4	$_{a}$-	-	3	-	.01	-
F	Leucelene ericoides	-	4	4	-	2	2	.15	.03
F	Lepidium montanum	$_{a}$-	$_{c}$24	$_{b}$4	-	10	3	.08	.01
F	Sphaeralcea coccinea	3	1	-	1	1	-	.00	-
Total for Annual Forbs		0	6	0	0	4	0	0.01	0
Total for Perennial Forbs		3	41	9	1	19	6	0.43	0.05
Total for Forbs		3	47	9	1	23	6	0.46	0.05

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 11B, Study no: 4

Type	Species	Strip Frequency		Average Cover %	
		'94	'00	'94	'00
B	Artemisia tridentata wyomingensis	74	82	15.10	16.59
B	Atriplex confertifolia	19	20	.45	.31
B	Ceratoides lanata	2	0	-	-
B	Chrysothamnus viscidiflorus stenophyllus	37	38	1.63	.66
B	Echinocereus spp.	0	1	-	.00
B	Gutierrezia sarothrae	81	95	2.20	4.37

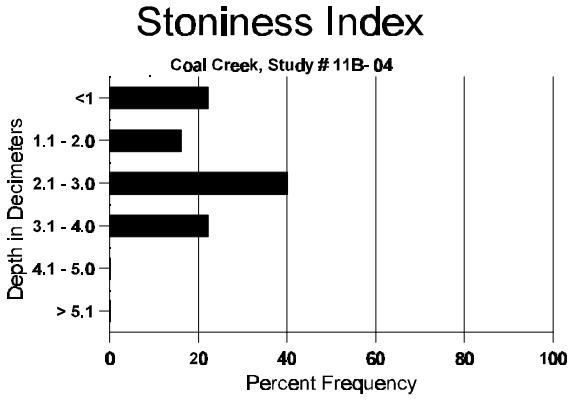
Type	Species	Strip Frequency '94	Strip Frequency '00	Average Cover % '94	Average Cover % '00
B	Juniperus osteosperma	0	1	-	-
B	Leptodactylon pungens	5	7	.30	.30
B	Opuntia spp.	28	34	.25	.48
Total for Browse		246	278	19.96	22.75

BASIC COVER --
Herd unit 11B, Study no: 4

Cover Type	Nested Frequency '94	Nested Frequency '00	Average Cover % '86	Average Cover % '94	Average Cover % '00
Vegetation	238	271	3.75	21.64	28.34
Rock	284	129	0	10.46	1.77
Pavement	291	319	18.25	4.25	17.54
Litter	369	320	39.00	20.09	17.54
Cryptogams	135	216	3.50	3.26	10.94
Bare Ground	339	360	35.50	35.29	47.24

SOIL ANALYSIS DATA --
Herd Unit 11B, Study # 4, Study Name: Coal Creek

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
13.20	50.2 (11.73)	7.5	54.0	22.0	24.0	1.0	6.4	140.8	0.6



PELLET GROUP FREQUENCY --
Herd unit 11B, Study no: 4

Type	Quadrat Frequency '94	Quadrat Frequency '00	Pellet Transect: Pellet Groups per Acre '00	Pellet Transect: Days Use per Acre (ha) '00
Rabbit	45	39	374	N/A
Elk	-	1	-	-
Deer	15	3	52	4 (10)

BROWSE CHARACTERISTICS --
Herd unit 11B, Study no: 4

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
S	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	132	-	-	11	-	-	-	-	-	143	-	-	-	2860			143
	00	22	-	-	56	-	-	23	-	-	101	-	-	-	2020			101
Y	86	2	2	1	-	-	-	-	-	-	5	-	-	-	333			5
	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
	00	68	-	-	32	-	-	15	-	-	115	-	-	-	2300			115
M	86	-	13	4	-	-	-	-	-	-	15	2	-	-	1133	14	15	17
	94	89	15	2	-	-	-	-	-	-	106	-	-	-	2120	20	31	106
	00	68	23	3	-	4	2	1	-	-	101	-	-	-	2020	22	35	101
D	86	-	3	3	-	-	-	-	-	-	6	-	-	-	400			6
	94	28	2	5	-	-	-	-	-	-	22	-	-	13	700			35
	00	38	11	2	4	5	2	-	-	-	32	1	-	29	1240			62
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	480			24
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	480			24

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	64%	29%	00%	+36%
'94	12%	05%	09%	+48%
'00	15%	03%	10%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	1866	Dec:	21%
	'94	2900		24%
	'00	5560		22%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Atriplex confertifolia																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	15	2	-	1	-	-	-	-	-	18	-	-	-	360	10	13	18
	00	-	-	1	-	1	5	-	-	-	7	-	-	-	140	8	14	7
D	86	-	-	2	-	-	-	-	-	-	-	-	2	-	133			2
	94	10	-	2	-	-	-	-	-	-	10	-	-	2	240			12
	00	-	1	-	-	-	8	1	-	9	-	-	-	19	380			19
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	80			4

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	100%	100%	+78%
'94	07%	07%	07%	-10%
'00	07%	85%	70%	

Total Plants/Acre (excluding Dead & Seedlings)				
'86	133	Dec:		100%
'94	600			40%
'00	540			70%

Ceratoides lanata																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	6	7	1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	86	2	-	6	-	-	-	-	-	-	2	-	6	-	533			8
	94	-	1	-	-	-	-	-	-	-	-	-	-	1	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	75%	75%	-89%
'94	33%	00%	33%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'86	533	Dec:		100%
'94	60			33%
'00	0			0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus stenophyllus																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66	3	7	1
	94	55	1	2	7	-	-	-	-	-	59	-	6	-	1300	7	10	65
	00	2	1	1	1	-	2	-	-	-	7	-	-	-	140	4	7	7
D	86	26	1	-	-	-	-	-	-	-	22	-	2	3	1800			27
	94	17	-	4	1	-	-	-	-	-	18	-	-	4	440			22
	00	19	-	1	8	-	-	32	-	-	10	-	-	50	1200			60
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	380			19

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	04%	00%	18%	- 7%
'94	01%	07%	11%	-22%
'00	01%	06%	74%	

Total Plants/Acre (excluding Dead & Seedlings)				
'86	1866	Dec:		96%
'94	1740			25%
'00	1360			88%

Echinocereus spp.																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	1	-	-	-	-	-	1	-	-	-	20	3	12	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'86	0	Dec:	-
'94	0		-
'00	20		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
S	86	13	-	-	-	-	-	-	-	-	12	-	-	1	866			13
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
Y	86	25	-	-	-	-	-	-	-	-	24	-	-	1	1666			25
	94	35	-	-	1	-	-	-	-	-	36	-	-	-	720			36
	00	47	-	-	5	-	-	-	-	-	52	-	-	-	1040			52
M	86	100	-	-	-	-	-	-	-	-	98	-	1	1	6666	7	8	100
	94	242	-	-	11	-	-	-	-	-	239	-	14	-	5060	8	7	253
	00	1164	-	-	19	-	-	-	-	-	1183	-	-	-	23660	4	5	1183
D	86	47	-	-	-	-	-	-	-	-	38	-	4	5	3133			47
	94	25	-	-	-	-	-	-	-	-	22	-	-	3	500			25
	00	109	-	-	-	-	-	1	-	-	55	-	2	53	2200			110
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	360			18
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	740			37

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	07%	-45%
'94	00%	00%	05%	+77%
'00	00%	00%	04%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	11465	Dec:	27%
	'94	6280		8%
	'00	26900		8%

Juniperus osteosperma																		
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	-	1	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	66	Dec:	-
	'94	0		-
	'00	20		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Leptodactylon pungens																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	21	-	-	-	-	-	-	-	-	21	-	-	-	420	5	7	21
	00	1	-	-	2	-	-	-	-	-	3	-	-	-	60	8	7	3
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
	00	3	-	14	-	-	-	12	-	-	22	-	-	7	580			29
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	05%	+37%
'00	00%	40%	20%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	0%
	'94	440		5%
	'00	700		83%

Opuntia spp.																		
Y	86	1	-	-	-	-	-	-	-	-	-	-	1	-	66			1
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	17	-	-	-	-	-	-	-	-	11	-	6	-	1133	4	6	17
	94	51	-	-	-	-	-	-	-	-	51	-	-	-	1020	3	11	51
	00	40	-	-	1	-	-	-	-	-	41	-	-	-	820	4	8	41
D	86	2	-	-	-	-	-	-	-	-	1	-	1	-	133			2
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	19	-	-	1	-	-	-	-	-	12	-	2	6	400			20
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	100			5

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	40%	-20%
'94	00%	00%	00%	+13%
'00	00%	00%	13%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	1332	Dec:	10%
	'94	1060		2%
	'00	1220		33%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Pinus edulis																		
S	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'86	00%	00%	00%
'94	00%	00%	00%
'00	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
'86	0	Dec:	-
'94	0		-
'00	0		-

Trend Study 11B-5-00

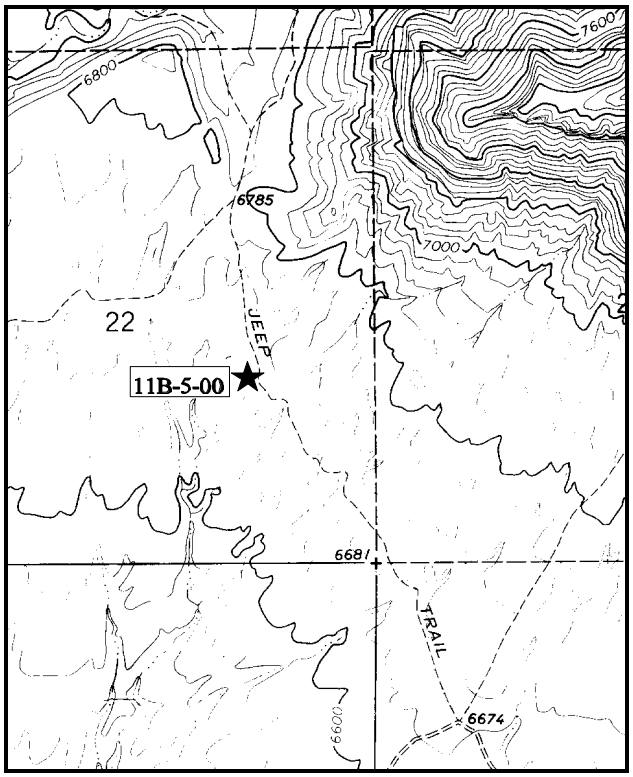
Study site name: B Canyon . Range type: Chained, Seeded P-J Burn

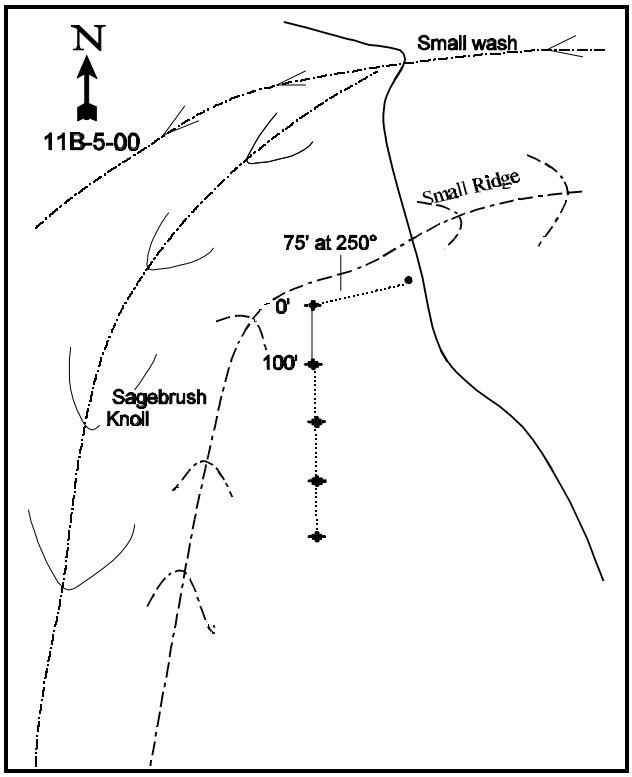
Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the Sunnyside City limit sign on Highway 123 at the west end of town, turn north and go 0.2 miles, passing the East Carbon High School football field. Turn right and go 0.95 miles. Turn right and pass through a yellow metal gate, continuing 0.3 miles to a cattle guard. Stay on the main road and go north 2.05 miles to an intersection. Keep left at the intersection (right turn goes to A Canyon transect) and go 0.75 miles more to just beyond the crest of a small hill. On the left side of the road you should find a large white rock. The transect, marked by a red painted rebar (tag #7894), starts 75 feet away at a bearing of 235°M.





Map Name: Sunnyside 7.5' Diagrammatic Sketch

Township 14S , Range 13E , Section 22 UTM. 4382172.724 N, 547990.634 E

DISCUSSION

Trend Study No. 11B-5 (32-6)

The 'B' Canyon study site is located near the mouth of 'B' Canyon on the gentle west-facing slope at the base of the Book Cliffs. Elevation at the site is 6,700 feet. The site is about 4 miles northwest of Sunnyside. Plans have been proposed to mine 15 million tons of coal from the 'B' Canyon mining project. Surface facilities, in addition to improved roads, would be located on public lands within the deer winter range. In 1966, the area was two-way chained and seeded to crested wheatgrass, fourwing saltbush, and nomad alfalfa. After 20 years, the site was again being dominated by the release of the young trees left after the original chaining. Pinyon and juniper density was estimated at 250 plants/acre (pinyon at 106 trees/acre and juniper at 149) in 1994, most were young trees. In 1996, the area was burned by a wildfire, and afterward, chained and apparently seeded with a dribbler. The wildfire eliminated all of the trees and nearly all of the shrubs. The only shrubs left are a few surviving mountain mahogany, bitterbrush, and resprouting green ephedra.

The site is on the Mud Springs grazing allotment, which is permitted for 338 cattle from mid-October to mid-June. The four pastures are rotated on the basis of forage condition and water availability as determined by the permittee. Cattle use on the site appears to be light to moderate. Judging from pellet groups, deer use is light, elk use is negligible, with rabbit use being somewhat heavier. Pellet group data from the 2000 reading estimate 9 deer and 4 cow days use/acre (22 ddu/ha, 10 cdu/ha). Rabbit pellets were frequently encountered.

The soil is moderately deep, but fairly rocky and variable as demonstrated by the presence of both black sagebrush and mountain big sagebrush prior to the fire. Effective soil depth is estimated at 13.7 inches. It has a sandy clay loam texture with a soil reaction that is neutral (7.3 pH). Phosphorus is limited at just 5.2 ppm, where values less than 10 ppm may limit normal plant growth and development. There are patches of exposed soil, but overall ground cover is good and erosion minimal. Rocks and pavement are found in the bare areas and large rocks and boulders are common within the soil profile and exposed on the surface. Many rocks in the soil profile contain a calcium carbonate crust.

The most numerous shrub prior to the 1996 fire was black sagebrush. It made up 56% of the browse cover in 1994 with a population of 6,080 plants/acre. The majority of these plants were mature and vigorous although rather heavily browsed in 1986. There was also some scattered mountain big sagebrush plants (180 plants/acre). Less numerous shrubs in the area included green ephedra (40 plants/acre) and true mountain mahogany (60 plants/acre). After the wildfire of 1996, there remained only a few surviving or resprouting fourwing saltbush (40 plants/acre), mountain mahogany (20 plants/acre), green ephedra (200 plants/acre), and bitterbrush (20 plants/acre). All of the fourwing and mountain mahogany and nearly all (90%) of the green ephedra were heavily hedged.

Before and after the fire, crested wheatgrass is the dominate herbaceous plant. They are tall, vigorous and appear to be lightly grazed. A few other valuable species, including Indian ricegrass, smooth brome, bluebunch wheatgrass, and mutton bluegrass are present, but provide only limited forage. Abundance of forbs is low as illustrated by no more than 1% cover for all forbs combined in 1994 and 2000.

1986 APPARENT TREND ASSESSMENT

The range appears to be in good condition. The key species, black sagebrush, is vigorous and productive. Although there is a fairly high percentage of decadent plants, there is a healthy number of young plants and the population appears stable. The one downward parameter is the increasing cover of the released pinyon and juniper, which in time could restrict growth and reproduction of more desirable browse species. Except for scattered bare patches, ground cover is excellent with little erosion. Therefore, the current soil trend appears to be stable also.

1994 TREND ASSESSMENT

The trend for soil is stable with percent bare ground decreasing slightly and a good cover value for grasses. The trend for browse is slightly up for the key browse species, black sagebrush. Percent decadency has declined (27% to 14%) and the percentage of plants that were moderate to heavily hedged has also gone down (67% to 1%). Trend for the herbaceous understory species is stable with nested frequency values that are almost unchanged from 1986. There was a slight decrease for the forbs, but altogether they provide less than 1% of the vegetative cover.

TREND ASSESSMENT
soil - stable (3)
browse - slightly up (4)
herbaceous understory - stable (3)

2000 TREND ASSESSMENT

Trend for soil is slightly down with percent bare ground increasing and litter cover and vegetative cover declining. Since the fire, vegetation cover has changed from mainly shrub and tree cover to mostly herbaceous cover. Grass cover has doubled with sum of nested frequency increasing. Even with this change in composition, the ratio of bare soil to protective cover has decreased significantly. Erosion is not a noticeable problem on the site due to the abundant herbaceous cover combined with the gentle slope. Trend for browse is down due to a loss of most shrubs to fire. The few surviving preferred browse species are being heavily used but should increase through time. Trend for the herbaceous understory is up with an increase in the sum of nested frequency for perennial grasses and forbs. Nested frequency of the dominant grass, crested wheatgrass, remained stable but several other species increased.

TREND ASSESSMENT
soil - down slightly due to fire (2)
browse - down, most browse eliminated due to the fire (1)
herbaceous understory - up (5)

HERBACEOUS TRENDS --
Herd unit 11B, Study no: 5

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
G	Agropyron cristatum	269	263	274	94	87	95	9.44	17.78
G	Agropyron intermedium	$_{a}$-	$_{a}$-	$_{b}$43	-	-	19	-	1.74
G	Agropyron smithii	4	-	-	2	-	-	-	-
G	Agropyron spicatum	$_{a}$-	$_{b}$6	$_{a}$-	-	3	-	.33	-
G	Bouteloua gracilis	-	-	3	-	-	1	-	.03
G	Bromus inermis	12	6	4	5	4	1	.21	.38
G	Dactylis glomerata	$_{a}$-	$_{a}$-	$_{b}$9	-	-	3	-	.04
G	Festuca ovina	$_{a}$-	$_{a}$-	$_{b}$15	-	-	9	-	.09
G	Hilaria jamesii	$_{a}$-	$_{b}$12	$_{a}$-	-	6	-	.10	-
G	Oryzopsis hymenoides	10	4	8	8	2	3	.06	.99
G	Poa fendleriana	$_{a}$-	$_{b}$7	$_{a}$-	-	3	-	.21	-
G	Sitanion hystrix	1	-	-	1	-	-	-	-
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		296	298	356	110	105	131	10.36	21.06
Total for Grasses		296	298	356	110	105	131	10.36	21.06
F	Arabis selbyi	$_{ab}$2	$_{b}$11	$_{a}$-	2	5	-	.02	-
F	Astragalus convallarius	$_{ab}$13	$_{a}$9	$_{b}$21	5	3	12	.20	.55
F	Astragalus wingatanus	$_{b}$21	$_{ab}$15	$_{a}$-	14	7	-	.46	.06
F	Chenopodium fremontii (a)	-	-	6	-	-	2	-	.01
F	Hedysarum boreale	2	-	3	2	-	1	-	.15
F	Lesquerella ludoviciana	3	7	5	1	3	3	.01	.01
F	Linum lewisii	-	-	8	-	-	3	-	.02
F	Machaeranthera grindelioides	3	1	-	1	1	-	.03	-
F	Medicago sativa	5	-	5	2	-	2	-	.01
F	Penstemon cyanocaulis	$_{b}$17	$_{a}$5	$_{a}$4	11	2	2	.01	.03
F	Salsola iberica (a)	-	-	12	-	-	4	-	.04
F	Sanguisorba minor	-	-	1	-	-	1	-	.03
F	Schoencrambe linifolia	$_{a}$-	$_{a}$3	$_{b}$16	-	2	8	.01	.06
F	Sphaeralcea coccinea	3	-	6	1	-	2	-	.01
Total for Annual Forbs		0	0	18	0	0	6	0	0.05
Total for Perennial Forbs		69	51	69	39	23	34	0.76	0.94
Total for Forbs		69	51	87	39	23	40	0.76	1.00

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 11B, Study no: 5

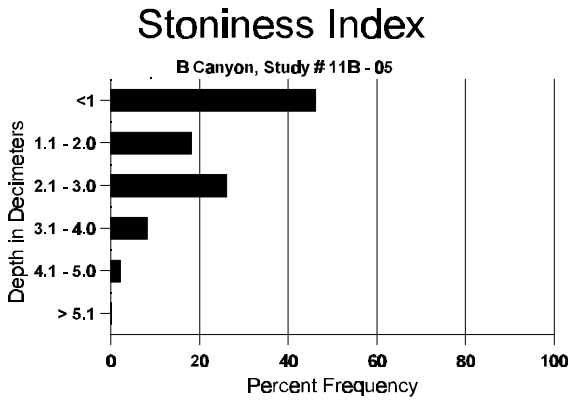
Type	Species	Strip Frequency '94	Strip Frequency '00	Average Cover % '94	Average Cover % '00
B	Artemisia nova	78	0	8.85	-
B	Artemisia tridentata vaseyana	3	0	.81	-
B	Atriplex canescens	0	2	-	-
B	Cercocarpus montanus	3	1	1.00	.03
B	Ephedra viridis	2	2	.41	.15
B	Gutierrezia sarothrae	8	1	.21	-
B	Juniperus osteosperma	0	0	3.00	-
B	Opuntia spp	1	0	-	-
B	Pinus edulis	0	0	1.63	-
B	Purshia tridentata	0	1	-	.15
Total for Browse		95	7	15.93	0.33

BASIC COVER --
Herd unit 11B, Study no: 5

Cover Type	Nested Frequency '94	Nested Frequency '00	Average Cover % '86	Average Cover % '94	Average Cover % '00
Vegetation	292	303	11.50	28.43	24.17
Rock	235	233	7.00	10.55	13.60
Pavement	195	323	3.75	1.52	6.80
Litter	386	359	60.50	45.45	30.78
Cryptogams	77	3	.75	2.80	.63
Bare Ground	244	350	16.50	15.73	38.27

SOIL ANALYSIS DATA --
Herd Unit 11B, Study # 5, Study Name: B Canyon

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
13.72	51.4 (13.78)	7.3	51.0	26.4	22.6	2.2	5.2	124.8	0.7



PELLET GROUP FREQUENCY --
Herd unit 11B, Study no: 5

Type	Quadrat Frequency '94	Quadrat Frequency '00	Pellet Transect: Pellet Groups per Acre '00	Pellet Transect: Days Use per Acre (ha) '00
Rabbit	20	66	209	N/A
Elk	1	-	-	-
Deer	35	20	113	9 (22)
Cattle	-	1	52	5 (11)

BROWSE CHARACTERISTICS --
Herd unit 11B, Study no: 5

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia nova																		
S	86	6	-	-	-	-	-	-	-	-	6	-	-	-	400			6
	94	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	86	6	1	2	-	-	-	-	-	-	9	-	-	-	600			9
	94	25	1	-	-	-	-	-	-	-	26	-	-	-	520			26
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	12	7	39	-	-	-	-	-	-	56	1	1	-	3866	9	16	58
	94	159	42	-	-	34	-	-	-	-	235	-	-	-	4700	15	21	235
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	86	3	1	21	-	-	-	-	-	-	23	-	2	-	1666			25
	94	24	11	2	1	5	-	-	-	-	33	-	-	10	860			43
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	220			11
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	10%	67%	03%	- 1%
'94	31%	.65%	03%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'86	6132	Dec:		27%
'94	6080			14%
'00	0			0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	-	3	-	-	-	-	-	-	-	3	-	-	-	200	20	20	3
	94	3	4	-	-	-	-	-	-	-	7	-	-	-	140	16	28	7
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	100%	00%	00%	-10%
'94	44%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	200	Dec:	0%
	'94	180		11%
	'00	0		0%

Atriplex canescens																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	1	-	-	1	2	-	-	-	40			2
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	100%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	66	Dec:	100%
	'94	0		0%
	'00	40		0%

Cercocarpus montanus																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	1	-	-	1	1	-	-	-	-	3	-	-	-	60	38	42	3
	00	-	-	-	-	-	1	-	-	-	1	-	-	-	20	9	8	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	33%	00%	00%	-67%
'00	00%	100%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	60		-
	'00	20		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Ephedra viridis																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	1	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	-	1	-	-	-	-	-	-	-	-	-	1	-	66	36	25	1
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40	26	24	2
	00	-	-	9	-	-	-	-	-	-	9	-	-	-	180	11	12	9

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	100%	00%	100%	-39%
'94	00%	00%	00%	+80%
'00	10%	90%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	66	Dec:	-
	'94	40		-
	'00	200		-

Gutierrezia sarothrae																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	12	-	-	-	-	-	-	-	-	12	-	-	-	240	8	7	12
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	-93%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	300		-
	'00	20		-

Juniperus osteosperma																		
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	1	-	1	-	1	-	-	-	-	3	-	-	-	200	72	35	3
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	25%	25%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	266	Dec:	-
	'94	0		-
	'00	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia spp.																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	5	13	1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6	16	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	20		-
	'00	0		-

Pinus edulis																		
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66	108	71	1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	132	Dec:	-
	'94	0		-
	'00	0		-

Purshia tridentata																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	13	24	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	0		-
	'00	20		-

Trend Study 11B-6-00

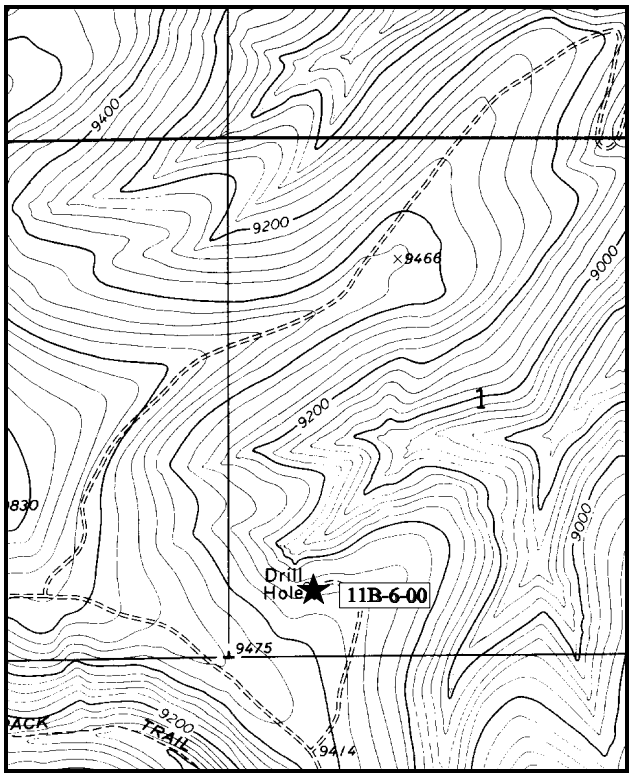
Study site name: Upper Cottonwood . Range type: Dry Meadow .

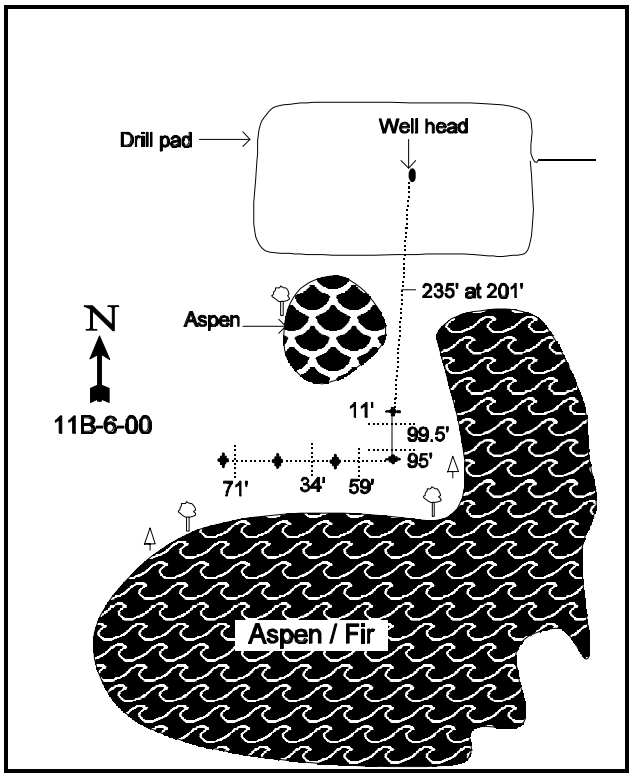
Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From Sunnyside, proceed up Water Canyon to the summit at Bruin Point (approximately 5.6 miles). Take the middle fork and go 0.35 miles to a cattle guard. Stay right just beyond the cattle guard and proceed 0.85 miles to an intersection. Go straight through the intersection and go 1.8 miles to a fork. Turn left and go 0.45 miles to the end of the road, an oil drilling pad. The baseline is located 235 feet south (201°) of the well head. The 0-foot end of the frequency baseline is marked by a 4-foot tall fence post tagged #7835.





Map Name: Bruin Point Diagrammatic Sketch

Township 14S , Range 14E , Section 1 UTM. 4386718.631 N, 559717.686 E

DISCUSSION

Trend Study No. 11B-6 (32-10)

The Upper Cottonwood transect is located in an open meadow surrounded by quaking aspen, subalpine fir, and Douglas fir. The high, cool north-facing slope supports an abundant variety of plant life at an elevation of 9,300 feet. The meadow is near the ridge top at the headwaters of Cottonwood Creek where the slope is 15% to 22%. The slope gets progressively steeper towards the bottom of the small canyons. The lack of a permanent water source nearby limits the use of the area by big game during the summer. Historically, cattle have been given season long use of the large Green River allotment, however this allotment has not been grazed since 1994. The large allotment is divided into 8 pastures which are permitted to be used from February 1st through October 15th for a total of 3,038 AUM's.

Oil and gas exploration has been carried out in the area in the past, but there are no signs of any current activity. An extensive road system encourages recreational use by the public throughout the area. There is evidence of vehicles driving off-road into the meadows. Camping activity has taken place, most likely during the summer and the deer hunt. Little deer sign was noted in 1994 as evidenced by the pellet group quadrat frequency of only 2%. Elk were more numerous on the site with a quadrat frequency of 17%. Data from the 2000 reading shows a quadrat frequency of 12% for elk pellet groups and a pellet group transect taken along the study site baseline estimates 25 elk and 8 deer days use/acre (62 edu/ha and 20 ddu/ha). Most of the deer and elk pellet groups appear to be from the spring.

Typical of high elevation sites with approximately 20 inches of annual precipitation, there is abundant plant life associated with fairly deep soils rich with organic matter (5.5% O.M.). Effective rooting depth is estimated at 17 inches. There is very little rock on the surface but occasional rocks are found in the profile. The soil itself is a clay loam with a neutral soil reaction (6.7 pH). Total ground cover from vegetation and litter is quite high and there is little unprotected bare soil.

The meadow provides succulent herbaceous forage on this summer range for both deer and elk. Browse is an insignificant vegetative component on this study site. However, a few seedling and young aspens provide some forage which had been moderately to heavily browsed in 1986. Heavy browsing could affect aspen regeneration in the meadow. The study site baseline was lengthened in 1994, but aspen was mistakenly not sampled in the shrub density strips so no comparisons can be made with the 1986 data. In 2000, there were an estimated 1,480 aspen trees/acre, 78% of which are young trees. Use on all aspen sampled appeared light. Some gooseberry current occurs in scattered patches. Even with it's prickly traits, it is still moderately palatable. Also present in the opening is mountain snowberry and scattered mountain big sagebrush. The site is surrounded by large mature aspen, subalpine fir, and Douglas fir which are slowly moving in from the edges.

The herbaceous understory is abundant and diverse, yet dominated by the increasers Kentucky bluegrass and dandelion which currently ('00) provide 59% of the herbaceous cover. Kentucky bluegrass forms a thick lawn-like cover over the meadow. The dense, vigorous root system and sod formed by the Kentucky bluegrass provides excellent erosion control. Other species (sedges and several bunchgrasses) are less abundant although they also provide additional forage. Forbs are an important source of forage for deer and elk on summer range. The forb composition is diverse with over 20 species sampled in 1994 and 2000. Dandelion dominates the composition and accounted for 61% of the forb cover in 1994 and 53% in 2000. Other more desirable, late serial forbs are present but in low numbers.

1986 APPARENT TREND ASSESSMENT

The soil, although potentially erodible, is well protected with herbaceous species and the trend appears stable. Vegetative trend also appears stable as invasion of the meadow by woody species is advancing slowly. The dense herbaceous component and some selective hedging on the browse species will help to slow the advancing invasion. However, conifers will eventually establish further into the opening and shade out more of the meadow if no action is taken. This would indicate a very long-term downward trend in terms of big game summer range. Fire is a way to maintain these openings if it can be done safely and efficiently. It is desirable to maintain these scattered open meadows with abundant "edge", especially for elk habitat. The herbaceous component, which is less diverse and abundant in the surrounding forest, provides important spring and summer forage for deer and elk.

1994 TREND ASSESSMENT

There is still an excellent herbaceous cover protecting the soil surface with percent bare ground decreasing since 1986. Trend for soils is up slightly. The trend for browse is slightly down, but for this summer range it is not a critical component as it contributes only 18% of the vegetative cover. Trend for the herbaceous understory is slightly up because of the moderate increase in the total nested frequency value for perennial grasses. The forbs and grasses contribute almost equal amounts of cover, 12% and 13% vegetative cover respectively.

TREND ASSESSMENT
soils - slightly improving (4)
browse - slightly down, but not critical for summer range (2)
herbaceous understory - slightly up (4)

2000 TREND ASSESSMENT

Trend for soil is stable with similar relative cover values of protective ground cover compared to 1994. There is no problem with erosion on the site. Browse is not an important component on this summer range but density of mountain big sagebrush and gooseberry currant have increased. A negative aspect to the browse trend is the increase in conifer cover. The browse trend is considered stable. The herbaceous understory is the key component on this summer range. Forbs and grasses are diverse and abundant but the grass component is dominated by the increaser, Kentucky bluegrass which currently accounts for 67% of the grass cover. Other common native grasses include blue wildrye and subalpine needlegrass. Nested frequency of Kentucky bluegrass has declined significantly since 1994 while subalpine needlegrass has increased significantly. Sum of nested frequency of all perennial grasses has declined slightly. The forb composition is dominated by the increaser, dandelion, which provides 53% of the forb cover. It has remained stable in nested frequency since 1994. Overall, cover of forbs has increased from 12% to 17% since the last reading. Sum of nested frequency has also increased. With this in mind, trend for the herbaceous understory is considered stable.

TREND ASSESSMENT
soils - stable (3)
browse - stable, but not critical for summer range (3)
herbaceous understory - stable, but composition poor (3)

HERBACEOUS TRENDS --
Herd unit 11B, Study no: 6

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
G	Agropyron spicatum	3	-	-	2	-	-	-	-
G	Bromus carinatus	$_{b}$73	$_{a}$6	$_{a}$27	31	4	10	.07	.44
G	Carex spp.	$_{a}$22	$_{b}$39	$_{ab}$26	9	17	15	.13	.35
G	Elymus glaucus glaucus	$_{a}$2	$_{b}$75	$_{b}$64	2	29	22	.64	1.11
G	Poa fendleriana	$_{b}$5	$_{a}$-	$_{ab}$3	3	-	1	-	.03
G	Poa pratensis	$_{b}$307	$_{b}$289	$_{a}$241	85	84	72	11.51	7.83
G	Stipa columbiana	$_{a}$-	$_{b}$23	$_{c}$63	-	13	29	.33	1.69
G	Stipa lettermani	$_{a}$1	$_{b}$55	$_{a}$22	1	23	8	.33	.17
G	Trisetum spicatum	$_{b}$6	$_{b}$14	$_{a}$-	4	5	-	.22	-
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		419	501	446	137	175	157	13.25	11.63
Total for Grasses		419	501	446	137	175	157	13.25	11.63
F	Achillea millefolium	$_{b}$160	$_{b}$144	$_{a}$91	67	58	39	1.52	.81
F	Agoseris aurantiaca	$_{a}$10	$_{a}$7	$_{b}$62	5	4	27	.02	.44
F	Antennaria parvifolia	37	38	41	16	16	17	.45	1.33
F	Androsace septentrionalis (a)	-	-	39	-	-	17	-	.33
F	Aquilegia coerulea	$_{b}$8	$_{a}$-	$_{a}$-	4	-	-	-	-
F	Arabis drummondi	$_{a}$1	$_{b}$17	$_{b}$9	1	8	5	.04	.05
F	Astragalus miser	$_{ab}$20	$_{a}$5	$_{b}$36	8	3	15	.01	.42
F	Aster spp.	$_{a}$-	$_{b}$41	$_{c}$89	-	17	33	.36	1.26
F	Calochortus gunnisoni	$_{b}$13	$_{a}$-	$_{a}$-	6	-	-	-	-
F	Chaenactis douglasii	$_{a}$-	$_{b}$9	$_{a}$-	-	3	-	.01	-
F	Chenopodium fremontii (a)	-	-	2	-	-	1	-	.03
F	Cirsium calcareum	15	24	9	8	13	5	.26	.02
F	Comandra pallida	$_{a}$-	$_{a}$-	$_{b}$17	-	-	9	-	.14
F	Collinsia parviflora (a)	$_{a}$-	$_{a}$-	$_{b}$7	-	-	4	-	.02
F	Descurainia pinnata (a)	$_{a}$-	$_{a}$-	$_{b}$32	-	-	14	-	.24
F	Erigeron speciosus	5	11	17	3	5	6	.10	.22
F	Fragaria vesca	$_{a}$8	$_{b}$39	$_{ab}$21	3	13	9	.70	.41
F	Gayophytum ramosissimum (a)	-	-	4	-	-	3	-	.04
F	Gentiana prostrata	$_{a}$-	$_{a}$-	$_{b}$35	-	-	14	-	.63
F	Lupinus argenteus	$_{a}$2	$_{a}$1	$_{b}$10	1	1	5	.03	.39
F	Monardella odoratissima	$_{b}$4	$_{a}$-	$_{a}$-	3	-	-	-	-
F	Osmorhiza occidentalis	-	5	3	-	3	2	.04	.01
F	Phlox longifolia	$_{c}$22	$_{b}$10	$_{a}$-	11	5	-	.02	-
F	Polygonum douglasii (a)	$_{a}$-	$_{b}$74	$_{a}$5	-	28	2	.16	.01

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
F	Potentilla gracilis	-	3	-	-	2	-	.01	-
F	Ranunculus alismaefolius	$_{b}$45	$_{a}$14	$_{a}$12	23	7	5	.03	.36
F	Silene menziesii	$_{b}$30	$_{b}$35	$_{a}$2	14	15	1	.15	.00
F	Taraxacum officinale	$_{a}$236	$_{b}$255	$_{ab}$253	84	84	86	7.49	9.01
F	Thalictrum fendleri	$_{a}$-	$_{ab}$4	$_{b}$7	-	2	3	.03	.01
F	Unknown forb-perennial	$_{b}$58	$_{a}$-	$_{a}$-	23	-	-	-	-
F	Viola adunca	54	53	56	25	23	29	.34	.87
F	Vicia americana	$_{b}$12	$_{ab}$6	$_{a}$-	5	2	-	.41	-
Total for Annual Forbs		0	74	89	0	28	41	0.16	0.68
Total for Perennial Forbs		740	721	770	310	284	310	12.07	16.44
Total for Forbs		740	795	859	310	312	351	12.23	17.12

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 11B, Study no: 6

Type	Species	Strip Frequency		Average Cover %	
		'94	'00	'94	'00
B	Abies lasiocarpa	0	11	2.13	4.99
B	Artemisia tridentata vaseyana	4	5	.03	1.13
B	Populus tremuloides	0	31	2.31	1.10
B	Pseudotsuga menziesii	0	0	-	.53
B	Purshia tridentata	0	1	-	-
B	Ribes montigenum	14	17	.82	1.83
B	Rosa woodsii	1	0	-	-
B	Symphoricarpos oreophilus	14	15	.23	.21
Total for Browse		33	80	5.54	9.81

CANOPY COVER --
Herd unit 11B, Study no: 6

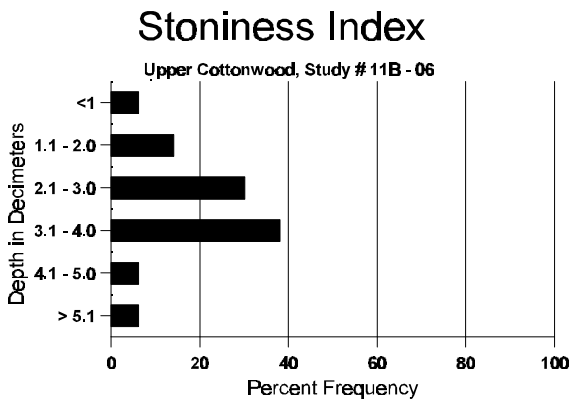
Species	Percent Cover '00
Abies lasiocarpa	6
Populus tremuloides	5

BASIC COVER --
Herd unit 11B, Study no: 6

Cover Type	Nested Frequency		Average Cover %		
	'94	'00	'86	'94	'00
Vegetation	368	352	27.75	36.17	45.02
Rock	134	29	.25	.59	.11
Pavement	92	69	.25	.21	.34
Litter	395	386	53.50	38.91	62.68
Cryptogams	59	34	0	2.36	.65
Bare Ground	254	232	18.25	11.34	17.66

SOIL ANALYSIS DATA --
Herd Unit 11B, Study # 6, Study Name: Upper Cottonwood

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
17.06	53.4 (17.24)	6.7	28.0	34.7	34.6	5.5	17.3	246.4	0.8



PELLET GROUP FREQUENCY --
Herd unit 11B, Study no: 6

Type	Quadrat Frequency		Pellet Transect	
	'94	'00	Pellet Groups per Acre 00	Days Use per Acre (ha) 00
Rabbit	4	-	-	-
Elk	17	12	331	26 (63)
Deer	2	-	104	8 (20)
Cattle	2	-	-	-

BROWSE CHARACTERISTICS --
Herd unit 11B, Study no: 6

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Abies lasiocarpa																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	3	-	-	-	-	-	-	-	-	2	1	-	-	60			3
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	14	-	-	-	-	-	-	-	-	13	1	-	-	280			14
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	3	-	-	-	-	-	-	2	-	5	-	-	-	100	-	-	5

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	0		-
	'00	380		-

Artemisia tridentata vaseyana																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80	23	20	4
	00	5	-	-	-	-	-	-	-	-	5	-	-	-	100	20	32	5

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	+17%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	100		-
	'00	120		-

Cercocarpus ledifolius																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	0		-
	'00	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Juniperus communis																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	26	120	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	0		-
	'00	0		-

Populus tremuloides																		
S	86	3	1	-	-	-	-	-	-	-	2	-	2	-	266			4
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	86	1	3	1	-	-	-	-	-	-	5	-	-	-	333			5
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	58	-	-	-	-	-	-	-	-	58	-	-	-	1160			58
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	5	-	-	-	-	-	-	10	-	15	-	-	-	300	-	-	15
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	280			14

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	60%	20%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	333	Dec:	0%
	'94	0		0%
	'00	1480		1%

Pseudotsuga menziesii																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	1	-	-	-	-	-	2	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	0		-
	'00	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Purshia tridentata																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	0		-
	'00	20		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Ribes montigenum																		
S	86	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	86	20	-	-	-	-	-	-	-	-	19	-	1	-	1333			20
	94	5	-	-	2	-	-	-	-	-	7	-	-	-	140			7
	00	2	-	-	1	-	-	-	-	-	3	-	-	-	60			3
M	86	14	-	-	-	-	-	-	-	-	14	-	-	-	933	25	28	14
	94	8	-	-	6	-	-	2	-	-	16	-	-	-	320	26	62	16
	00	25	-	-	5	-	-	5	-	-	34	1	-	-	700	20	43	35
D	86	5	-	-	-	-	-	-	-	-	3	-	-	2	333			5
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	08%	-82%
'94	00%	00%	00%	+39%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	2599	Dec:	13%
	'94	460		0%
	'00	760		0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Rosa woodsii																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	14	12	1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	20		-
	'00	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Symphoricarpos oreophilus																		
S	86	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	86	5	-	-	-	-	-	-	-	-	5	-	-	-	333			5
	94	6	-	-	-	-	-	-	-	-	6	-	-	-	120			6
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	86	6	-	-	-	-	-	-	-	-	6	-	-	-	400	22	24	6
	94	7	2	-	6	-	-	-	-	-	15	-	-	-	300	17	24	15
	00	10	2	-	2	-	-	-	-	-	14	-	-	-	280	18	24	14
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
	00	1	-	-	1	-	-	-	-	-	1	-	-	1	40			2
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	-40%
'94	09%	00%	05%	-14%
'00	11%	00%	05%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	733	Dec:	0%
	'94	440		5%
	'00	380		11%

Trend Study 11B-7-00

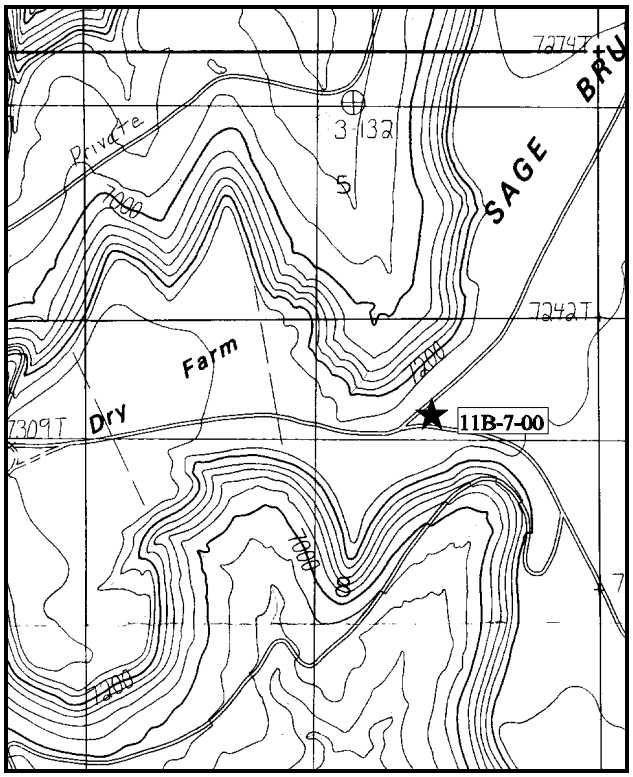
Study site name: Cottonwood . Range type: Big Sagebrush .

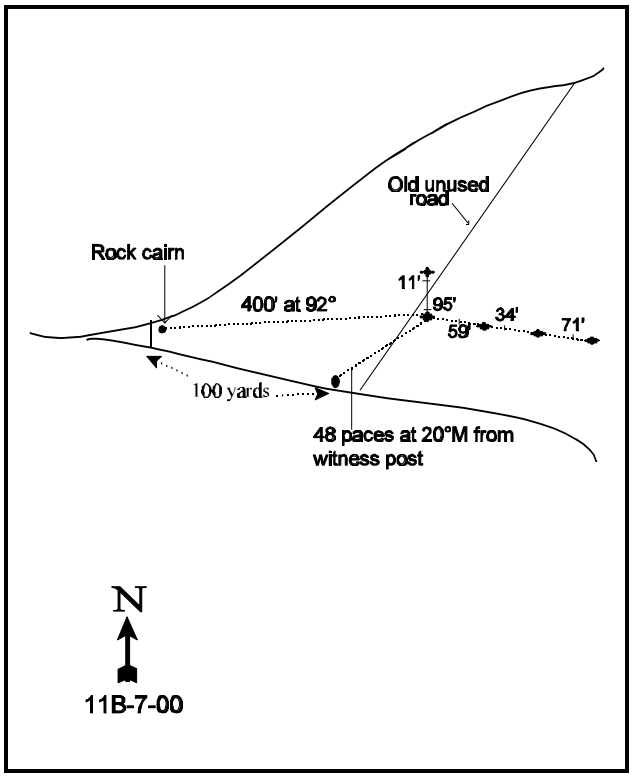
Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks frequency belts) line 1 (11 & 95ft), line 2 (59ft), line 3 (34ft), line 4 (71ft).

LOCATION DESCRIPTION

At the Range Creek Summit (Bruin Point) take the middle fork and go 0.35 miles. Stay right at the fork just beyond a cattle guard and go 0.9 miles. Pass straight through an intersection beyond the next cattle guard and go 3.1 miles. Turn left at the fork and continue 2.5 miles. Pass through a gate near a cabin and continue 3.2 miles. Cross a cattle guard and proceed 5.3 miles on the main road. Bear right, cutting across the angle of a fork, and go 0.2 miles to a cattle guard. Continue 0.5 miles to another major fork. Stay right and go 100 yards to a rebar witness post on left side of the road. The 100-foot baseline stake is 48 paces at 20°M from the witness post. All markers are rebar, and the 0-foot end of the baseline has a browse tag #7872 attached.





Map Name: Twin Hollow Diagrammatic Sketch

Township 13S , Range 16E , Section 8 UTM. 4396125.773 N, 573453.778 E

DISCUSSION

Trend Study No. 11B-7 (32-11)

The Cottonwood transect samples a sagebrush flat at the northeast end of Cottonwood Ridge. The extensive sagebrush opening is surrounded by a mature pinyon pine woodland which gradually slopes down to steep canyons that drain east into the Green River. Terrain at the study site is nearly level with an elevation of 7,200 feet. A pellet group transect which runs north of the transect was read every year until 1989 when it was dropped. Data from the previous years was quite variable, but no use was the most common result. During the 12 years previous to 1989, deer did not use the area during most of the winters, and use ranged from 1 to 9 deer days use/acre (2 to 23 ddu/ha) during any one year. Correspondingly, few deer and elk pellet groups were found on the study site. Both deer and elk had the same quadrat frequency in 1994 (10%). Quadrat frequency of deer and elk pellet groups dropped in 2000 to only 1% and 6% respectively. A pellet group transect read along the study site baseline in 2000 estimates 23 elk and 1 deer days use/acre (57 edu/ha and 2 ddu/ha). Cattle grazing pressure also appears to have been low during past readings and widely dispersed. As part of the Green River allotment, the area receives spring cattle use during some years, although the allotment has been closed to grazing since 1994.

The soil is moderately deep and rocky with an effective rooting depth estimated at nearly 14 inches. There appears to be a layer of bedrock or a hardpan 12-16 inches below the surface. Deeper depth measurements were possible under sagebrush. The soil is a loam with a slightly alkaline soil reaction (7.4 pH). Phosphorus is limited at only 4.6 ppm, where values less than 10 ppm may limit normal plant growth and development. Much of the soil surface was exposed in 1986 when 59% of the ground surface was estimated as bare ground. Bare ground continues to be moderately high at around 40%. Litter and cryptogamic cover is limited to the areas beneath the sagebrush canopy. There is some evidence of soil movement and soil pedestaling around sagebrush, but the flat terrain prevents severe erosion.

This sagebrush flat is dominated by an overly mature stand of Wyoming big sagebrush which provided 96% of the browse cover in 1994 and 98% in 2000. The sagebrush density was estimated at 5,132 plants/acre in 1986, decreasing slightly in 1994 to 4,020 plants/acre. Most of the change in density appears to be from the loss of decadent plants which had a density of 3,400 plants/acre in 1986 and 1,420 by 1994. This change along with an increase in mature plants has reduced percent decadency from 66% to 35%. The percentage of the plants showing poor vigor also improved from 32% in 1986 to only 14% in 1994. Density increased slightly to 4,140 plants/acre in 2000 but vigor is poor on 31% of the plants sampled and 69% of the population is now decadent. A large proportion of the mature sagebrush sampled in 1994 are now decadent and 43%, or 1,240 plants/acre, of those decadent shrubs appear to be dying. Reproduction is currently poor. Sagebrush showing heavy use has increased steadily from 12% in 1986 to 19% in 1994, and 32% in 2000. Currently (‘00), 61% of the sagebrush sampled display moderate to heavy use. The plants on this site have produced limited new growth and are not very vigorous. This condition makes the hedging appear more severe when coupled with the extended drought.

Broom snakeweed, an increaser, occurs in the bare interspaces. It has fluctuated in density but currently appears to have a stable, mostly mature population. Very few pinyon are found in the flat and they do not appear to be increasing. The surrounding woodland provides good cover.

Herbaceous plants are not of much importance in terms of deer winter range. However, the herbaceous species do provide some spring forage. Grass abundance is moderate for a Wyoming sagebrush type. The majority of the grasses are found in the protection of the sagebrush with exception of needle-and-thread and western wheatgrass. In recent years, grazing pressure has been moderate, but historically the area was subjected to long periods of excessive use by livestock. Since 1994, with no livestock grazing, cover of perennial grasses has nearly tripled and frequency has increased as well.

Forbs are diverse and produced as much cover as the grasses in 1994. Due to dry conditions in 2000, frequency of forbs declined. The majority of the forbs are found growing within the protection of the sagebrush, except for the low rounded mats of desert phlox. None are particularly important. Lobe-leaf groundsel, scarlet globemallow, and desert phlox are the most obvious species.

1986 APPARENT TREND ASSESSMENT

The key species, Wyoming big sagebrush, shows a high incidence of decadence (66%) and poor vigor (32%), but the biotic potential (# of seedlings) is 30%. Recruitment appears adequate to maintain the stand so trend appears to be fairly stable. The shallow soil is a factor that cannot be changed, but a favorable water year would do much to improve the condition of the sagebrush. At this time, there does not appear to be excessive use by livestock or big game. Due to it's scattered and clumped distribution, the winterfat will always appear to be over utilized. The soil is in poor condition due to the large amounts of unprotected bare ground and lack of litter cover.

1994 TREND ASSESSMENT

The trend for soils has improved slightly since 1986 with the decrease in percent bare ground from 59% to 44% and a significant increase in the sum of nested frequency for western wheatgrass which is highly rhizomatous. The key browse, Wyoming big sagebrush, makes up 96% of the browse cover. It has experienced significant improvements in vigor and a decrease in percent decadence. The density has gone down, but the population appears more healthy and vigorous. Trend for browse is stable. The herbaceous understory has noted a slight increase in nested frequency for grasses and forbs. There has been a very significant increase in western wheatgrass. Trend for herbaceous understory is slightly improved.

TREND ASSESSMENT
soil - slightly up (4)
browse - stable (3)
herbaceous understory - slightly up (4)

2000 TREND ASSESSMENT

Trend for soil appears to be improving slightly with similar amounts of bare ground combined with increased perennial grass cover and nested frequency. Trend for the key browse species, Wyoming big sagebrush is slightly down. Density has increased slightly from 4,020 plants/acre in 1994 to 4,140 by 2000. However, the proportion of plants in poor vigor has increased from 14% in 1994 to 31%, and percent decadence has gone up from 35% to 69%. Reproduction is poor and 1,240 plants/acre of the decadent sagebrush are classified as dying. There is currently not enough young plants to replace the dying shrubs. Use is moderate to heavy but these shrubs are not very vigorous and have limited growth which makes them appear more heavily hedged. The downward trend is more a response to the increased competition with the herbaceous understory combined with the extremely dry conditions of the past few years. An above normal precipitation pattern, especially in the spring and early summer, would do much to reverse this trend. The herbaceous understory displays a mixed trend. Cover and frequency of perennial grasses have increased dramatically. The biggest change comes from the significant increase in Indian ricegrass. On the down side, due in part to the dry spring and summer, frequency of perennial forbs has declined. Overall, the herbaceous trend is considered up slightly.

TREND ASSESSMENT
soils - slightly improving (4)
browse - slightly down (2)
herbaceous understory - slightly up (4)

HERBACEOUS TRENDS --
Herd unit 11B, Study no: 7

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
G	Agropyron smithii	$_{a}$88	$_{b}$203	$_{b}$235	35	71	87	2.58	4.73
G	Elymus salina	$_{a}$-	$_{b}$7	$_{b}$6	-	3	3	.18	.01
G	Oryzopsis hymenoides	$_{a}$73	$_{a}$65	$_{b}$116	34	27	47	1.00	6.86
G	Poa fendleriana	$_{b}$14	$_{ab}$8	$_{a}$2	7	3	1	.01	.03
G	Sitanion hystrix	$_{b}$68	$_{a}$26	$_{a}$30	32	11	15	.30	.61
G	Stipa comata	$_{b}$116	$_{a}$79	$_{ab}$99	56	37	37	1.57	3.81
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		359	388	488	164	152	190	5.66	16.09
Total for Grasses		359	388	488	164	152	190	5.66	16.09
F	Antennaria rosea	$_{a}$-	$_{a}$-	$_{b}$11	-	-	4	-	.02
F	Arabis drummondi	$_{b}$20	$_{a}$8	$_{a}$4	12	4	2	.01	.01
F	Castilleja chromosa	$_{b}$5	$_{ab}$1	$_{a}$-	4	1	-	.00	-
F	Chaenactis douglasii	-	1	-	-	1	-	.00	-
F	Cryptantha fulvocanescens	$_{b}$48	$_{c}$73	$_{a}$-	23	31	-	.65	-
F	Erigeron eatonii	-	1	4	-	1	2	.00	.01
F	Eriogonum racemosum	-	4	-	-	2	-	.01	-
F	Erigeron speciosus	$_{b}$6	$_{a}$-	$_{a}$-	4	-	-	-	-
F	Hymenoxys acaulis	$_{a}$-	$_{a}$7	$_{b}$18	-	3	11	.01	.10
F	Lesquerella spp.	$_{B}$19	$_{ab}$18	$_{a}$7	11	7	3	.03	.01
F	Machaeranthera canescens	-	1	-	-	1	-	.00	-
F	Phlox austromontana	$_{a}$144	$_{b}$203	$_{b}$199	62	83	78	4.51	5.32
F	Senecio multilobatus	$_{b}$71	$_{c}$107	$_{a}$3	34	53	2	.49	.01
F	Sphaeralcea coccinea	34	21	30	14	12	14	.11	.11
F	Townsendia incana	$_{b}$54	$_{b}$32	$_{a}$5	25	17	4	.08	.02
F	Unknown forb-perennial	$_{b}$9	$_{a}$-	$_{a}$-	3	-	-	-	-
Total for Annual Forbs		0	0	0	0	0	0	0	0
Total for Perennial Forbs		410	477	281	192	216	120	5.95	5.63
Total for Forbs		410	477	281	192	216	120	5.95	5.63

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 11B, Study no: 7

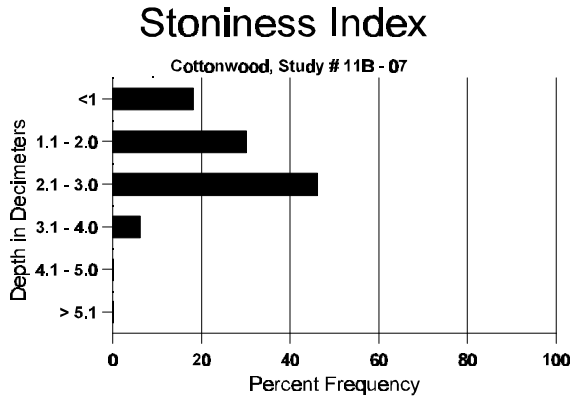
Type	Species	Strip Frequency '94	Strip Frequency '00	Average Cover % '94	Average Cover % '00
B	Artemisia tridentata wyomingensis	85	84	14.30	15.89
B	Ceratoides lanata	3	1	-	-
B	Gutierrezia sarothrae	39	27	.59	.29
B	Opuntia spp.	3	3	-	.00
B	Pinus edulis	0	2	.00	.00
Total for Browse		130	117	14.90	16.20

BASIC COVER --
Herd unit 11B, Study no: 7

Cover Type	Nested Frequency '94	Nested Frequency '00	Average Cover % '86	Average Cover % '94	Average Cover % '00
Vegetation	325	331	4.25	25.72	38.57
Rock	181	49	.75	2.25	1.16
Pavement	285	230	9.00	1.00	1.81
Litter	363	346	25.75	16.70	24.78
Cryptogams	142	245	1.25	2.92	8.11
Bare Ground	365	346	59.00	43.98	40.79

SOIL ANALYSIS DATA --
Herd Unit 11B, Study # 7, Study Name: Cottonwood

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
13.89	62.4 (15.12)	7.4	42.0	31.4	26.6	2.3	4.6	208.0	0.8



PELLET GROUP FREQUENCY --
Herd unit 11B, Study no: 7

Type	Quadrat Frequency '94	Quadrat Frequency '00	Pellet Transect: Pellet Groups per Acre '00	Pellet Transect: Days Use per Acre (ha) '00
Rabbit	43	40	261	N/A
Elk	10	6	305	24 (58)
Deer	10	1	17	2 (4)

BROWSE CHARACTERISTICS --
Herd unit 11B, Study no: 7

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
S	86	22	1	-	-	-	-	-	-	-	23	-	-	-	1533			23
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	86	6	-	1	-	-	-	-	-	-	6	-	-	1	466			7
	94	1	-	-	2	-	-	-	-	-	3	-	-	-	60			3
	00	6	1	-	-	-	-	-	-	-	6	-	-	1	140			7
M	86	10	8	1	-	-	-	-	-	-	10	8	-	1	1266	24	25	19
	94	102	21	5	-	-	-	-	-	-	128	-	-	-	2560	22	31	128
	00	20	19	17	-	1	-	-	-	-	56	1	-	-	1140	21	32	57
D	86	18	26	7	-	-	-	-	-	-	19	9	2	21	3400			51
	94	13	24	31	-	-	2	-	-	-	41	-	-	29	1400			70
	00	54	31	49	-	9	-	-	-	-	79	-	2	62	2860			143
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	580			29
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	1240			62

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	44%	12%	32%	-22%
'94	22%	19%	14%	+ 3%
'00	29%	32%	31%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	5132	Dec:	66%
	'94	4020		35%
	'00	4140		69%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Ceratoides lanata																		
Y	86	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	94	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	1	1	2	-	-	-	-	-	-	4	-	-	-	266	9	6	4
	94	1	-	-	-	-	-	2	-	-	3	-	-	-	60	6	5	3
	00	-	-	-	-	-	1	-	-	-	1	-	-	-	20	-	-	1
D	86	-	-	1	1	-	-	-	-	-	1	-	-	1	133			2
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	11%	33%	11%	-87%
'94	00%	00%	00%	-75%
'00	00%	100%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	599	Dec:	22%
	'94	80		0%
	'00	20		0%

Gutierrezia sarothrae																		
S	86	6	-	-	-	-	-	-	-	-	6	-	-	-	400			6
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	86	4	-	-	-	-	-	-	-	-	4	-	-	-	266			4
	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	00	10	-	-	-	-	-	-	-	-	10	-	-	-	200			10
M	86	5	-	-	-	-	-	-	-	-	5	-	-	-	333	7	3	5
	94	121	-	-	-	-	-	-	-	-	121	-	-	-	2420	5	7	121
	00	74	-	-	-	-	-	-	-	-	74	-	-	-	1480	3	4	74
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	7	-	1	-	-	-	-	-	-	2	-	-	6	160			8
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	360			18
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	+77%
'94	00%	.76%	05%	-36%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	599	Dec:	0%
	'94	2620		6%
	'00	1680		0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia spp.																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	86	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	3	-	2	-	-	-	-	-	-	3	-	-	2	100	2	5	5
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40	3	6	2
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	2	-	-	-	-	-	-	-	-	-	2	40			2
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	-30%
'94	00%	57%	57%	-57%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	200	Dec:	0%
	'94	140		29%
	'00	60		0%

Pinus edulis

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	1	-	-	-	-	-	2	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	66	Dec:	-
	'94	0		-
	'00	40		-

Trend Study 11B-8-00

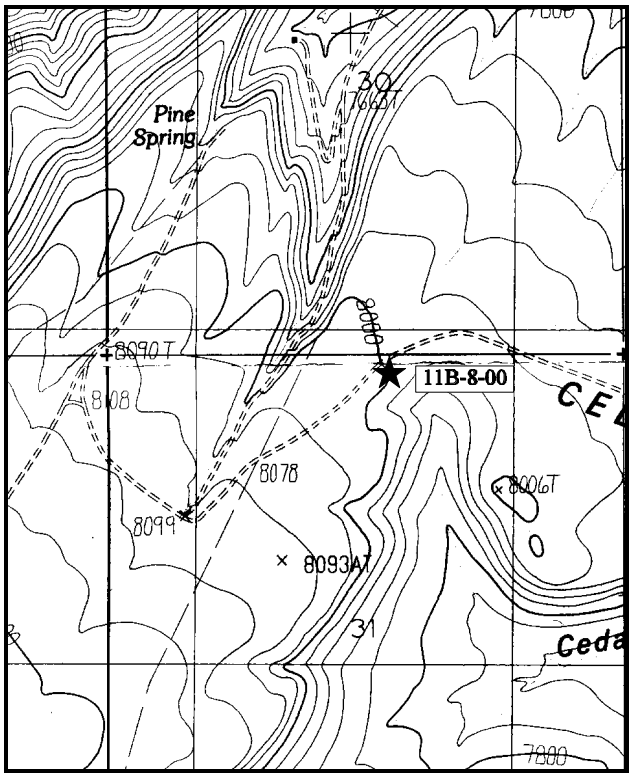
Study site name: Cedar Corral . Range type: Pinyon-Juniper .

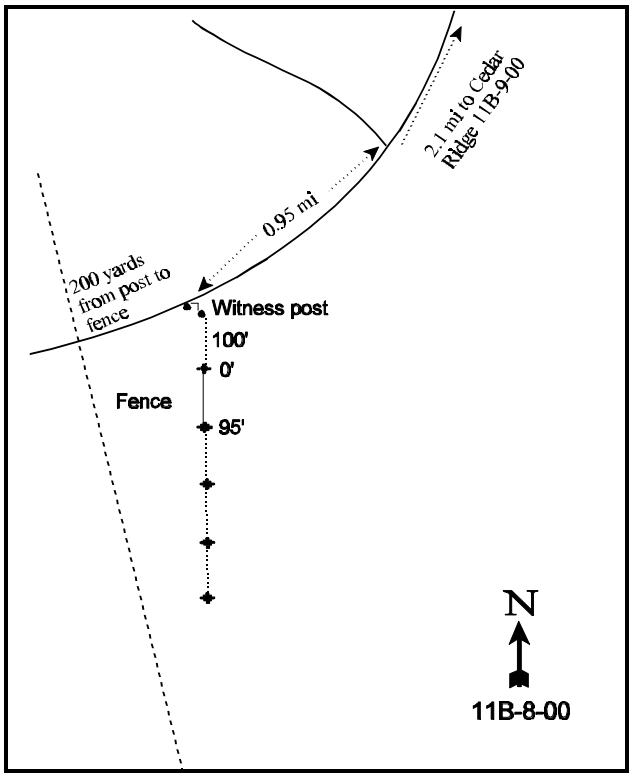
Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). Belt 2 rebar @ 5ft.

LOCATION DESCRIPTION

From Bruin Point take the middle fork and go 0.35 miles. Stay right at the fork just beyond a cattle guard and go 0.9 miles. Proceed past another cattle guard, go straight through an intersection and continue 3.1 miles. Turn left at the fork and continue 2.5 miles to a gate by a cabin. Continue 3.2 miles, cross a cattle guard and go 5.3 miles more on the main road to a fork where you bear right. Go 0.2 miles to a cattle guard. Continue 0.5 miles to a major fork. Stay right and go 0.4 miles (passing 11B-7-00) to a fork. Stay right on the main road and go 4.8 miles to a junction. Turn left and go 2.7 miles to a "T" intersection. Turn right and proceed 0.95 miles to a witness post (fence post surrounded by pile of rocks) on the left side of the road, fifteen feet beyond a pinyon. The 0-foot end of the baseline (marked by a fence post tagged #7801) is 100 feet south of the witness post. There is a fence crossing the road approximately 200 yards southwest of the witness post.





Map Name: Twin Hollow Diagrammatic Sketch

Township 13S , Range 16E , Section 31 UTM. 4389651.061 N, 571353.333 E

DISCUSSION

Trend Study No. 11B-8 (32-12)

The Cedar Corral site is located at a moderately high elevation (8,100 feet) on the southern part of the West Tavaputs Plateau. This study samples a part of the pinyon-juniper mountain brush-grass type with a northeast aspect on a nearly level slope (1%-2%). The study is on BLM land, just across the fence from private land. Cattle grazed the area in the past as part of the Green River allotment. However, there has been no cattle grazing on this allotment since 1994. The area also serves as big game winter range. The grasses are rather depleted in this type, with better elk forage found in the intermittent openings. The large pinyon provide excellent hiding and thermal cover, but the high elevation of the site would limit it's use in many winters. Pellet group observations indicate light deer and elk use. Pellet group data from the 2000 reading estimate 8 deer and 10 elk days use/acre (20 ddu/ha and 25 edu/ha). Wild horse use is estimated at 9 days use/acre (22 hdu/ha). The Range Creek unit is used by an estimated 213 wild horses which reside in two groups. One group frequents the Cottonwood and Cold ridge area, while the other group primarily uses the Cedar ridge area. In addition, some sage grouse sign was also encountered.

The soil is moderately shallow, yet quite variable as evidenced with the presence of black sagebrush and mountain big sagebrush. Effective soil depth is estimated at just over 9 inches. It is very compacted with abundant rocks on the surface and throughout the profile. There are also extensive sandstone rock layers just under the surface in some areas. The soil has a sandy clay loam to sandy loam texture with a marginally neutral soil reaction (6.6 pH). Organic matter is low at 1.9 % and phosphorus is limited at just 4.5 ppm. Phosphorus levels less than 10 ppm may limit normal plant growth and development. There is evidence of erosion and soil movement, but the level terrain keeps water erosion to a minimum. There is a build-up of soil, litter and cryptogams under the scattered shrubs. Soil is deeper under the old pinyon.

Pinyon pine is the dominant overstory tree species with an estimated density of 128 trees/acre in 2000 using point-center quarter data. Overhead canopy cover is estimated at 15%. Utah juniper and Rocky Mountain juniper are less common with an estimated density of 11 and 8 trees/acre respectively. Valuable deer browse species include, true mountain mahogany, mountain big sagebrush, black sagebrush, and serviceberry. These key species currently ('00) make up 75% of the total browse cover. Utilization has been mostly light to moderate since 1986. Vigor is generally good and percent decadence low.

Several desirable forage grasses occur on the site, but overall abundance is erratic with a low cover value of only 3% in 1994 and 6% in 2000. Common species include: thickspike and bluebunch wheatgrass, and mutton and Sandberg bluegrass. Utilization of grasses is light. A variety of forbs are present, but the majority are small, low-growing varieties and their contribution to forage production is small. Combined, forbs do produce more cover than grasses. The most abundant species is the succulent, lance-leaved sedum or stonecrop. The only other common species include pussy toes, hairy goldaster, and desert phlox.

1986 APPARENT TREND ASSESSMENT

As far as browse species are concerned, vegetative trend is considered stable to possibly up because of the current excellent vigor and reproduction of the important browse species. If the management objective stresses the importance of grasses however, they are not fairing quite as well and under continued cattle grazing may decrease further. The soil trend appears stable.

1994 TREND ASSESSMENT

The soil trend is considered stable at this time, but with the continuing loss of grasses and forbs. This trend should be closely monitored. Overall trend for the five key browse is slightly up with significant decreases in

percent decadency and improved vigor. The herbaceous trend is slightly down due to a decrease in the sum nested frequency of grasses and forbs.

TREND ASSESSMENT
soil - stable (3)
browse - slightly up (4)
herbaceous understory - slightly down (2)

2000 TREND ASSESSMENT

Trend for soil is up slightly due to an increase in vegetative and litter cover combined with a decline in percent bare ground. Trend for browse appears stable with similar densities, good vigor and reproduction, low decadence, and mostly light use of the key species. It appears that deer and elk do not use this area very heavily. The only question to the browse trend is: will the pinyon and juniper continue to increase in canopy cover and how quickly? Currently, pinyon provides an overhead canopy cover of 15%. It doesn't currently appear to be effecting the understory shrubs. However, if it increases in the future, it will come at the expense of the understory shrubs and herbaceous plants. Trend for the herbaceous understory is down slightly due to a decline in the sum of nested frequency of perennial grasses and forbs. Sum of nested frequency of grasses and forbs have steadily declined since 1986 when the site was established. This is likely due to the increase in cover of shrubs and trees.

TREND ASSESSMENT
soils - up slightly (4)
browse - stable (3)
herbaceous understory - slightly down (2)

HERBACEOUS TRENDS --
Herd unit 11B, Study no: 8

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
G	Agropyron dasystachyum	a43	ab59	b66	17	29	30	.22	.42
G	Agropyron spicatum	b163	a41	a42	67	18	18	.41	1.81
G	Koeleria cristata	c23	b7	a-	11	3	-	.16	-
G	Oryzopsis hymenoides	13	2	17	5	1	7	.03	.28
G	Poa fendleriana	a18	b79	b65	8	28	29	1.65	1.75
G	Poa secunda	b85	a45	a56	40	18	24	.50	1.25
G	Sitanion hystrix	a1	b21	a-	1	11	-	.39	-
G	Stipa comata	a-	ab4	b10	-	2	4	.03	.21
G	Stipa lettermani	a-	b15	a-	-	5	-	.12	-
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		346	273	256	149	115	112	3.54	5.75
Total for Grasses		346	273	256	149	115	112	3.54	5.75
F	Allium spp.	a-	b26	a2	-	12	2	.06	.06
F	Antennaria rosea	57	60	61	23	22	23	2.25	2.48
F	Arabis drummondi	b41	a3	a-	18	1	-	.00	-
F	Arabis perennans	b21	b14	a-	10	5	-	.02	-
F	Astragalus argophyllus	8	5	1	4	2	1	.03	.00
F	Castilleja flava	2	-	-	1	-	-	-	-
F	Castilleja linariaefolia	-	-	3	-	-	1	-	.00
F	Calochortus nuttallii	1	2	-	1	1	-	.00	-
F	Chaenactis douglasii	-	5	-	-	2	-	.01	-
F	Collinsia parviflora (a)	-	1	-	-	1	-	.00	-
F	Crepis acuminata	b21	a-	a2	11	-	2	-	.01
F	Cryptantha spp.	-	-	1	-	-	1	-	.03
F	Eriogonum alatum	b11	a-	a-	5	-	-	-	-
F	Erigeron eatonii	b100	a27	a13	48	10	8	.12	.06
F	Erigeron flagellaris	a12	b37	ab21	5	17	11	.13	.18
F	Eriogonum racemosum	a-	b11	a-	-	5	-	.19	-
F	Eriogonum umbellatum	b59	a21	ab43	28	12	20	.20	.27
F	Heterotheca villosa	a7	b30	b37	4	13	19	.82	1.79
F	Ipomopsis aggregata	11	10	3	4	4	1	.02	.00
F	Linum lewisii	-	4	-	-	2	-	.01	-
F	Lomatium triternatum	b29	a-	a3	13	-	2	-	.01
F	Machaeranthera canescens	-	2	-	-	1	-	.03	-
F	Machaeranthera grindelioides	4	-	-	3	-	-	-	-
F	Penstemon spp.	-	3	4	-	1	2	.00	.01

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
F	Phlox austromontana	$_{b}$31	$_{a}$15	$_{b}$28	14	7	13	.43	.91
F	Phlox longifolia	-	-	3	-	-	2	-	.01
F	Polygonum douglasii (a)	$_{a}$-	$_{b}$35	$_{a}$4	-	13	1	.06	.00
F	Sedum lanceolatum	$_{a}$135	$_{b}$210	$_{a}$152	56	69	58	3.44	2.44
F	Senecio multilobatus	-	1	-	-	1	-	.00	-
F	Sphaeralcea coccinea	$_{a}$-	$_{b}$9	$_{a}$-	-	4	-	.04	-
F	Taraxacum officinale	-	3	-	-	2	-	.04	-
F	Trifolium spp.	$_{b}$32	$_{a}$-	$_{a}$-	15	-	-	-	-
Total for Annual Forbs		0	36	4	0	14	1	0.07	0.00
Total for Perennial Forbs		582	498	377	263	193	166	7.91	8.30
Total for Forbs		582	534	381	263	207	167	7.98	8.31

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 11B, Study no: 8

Type	Species	Strip Frequency		Average Cover %	
		'94	'00	'94	'00
B	Amelanchier utahensis	25	23	4.46	6.61
B	Artemisia frigida	-	-	.00	-
B	Artemisia nova	49	40	3.44	2.45
B	Artemisia tridentata vaseyana	57	66	6.50	9.81
B	Cercocarpus montanus	12	19	1.87	3.09
B	Chrysothamnus depressus	31	23	.25	.25
B	Chrysothamnus nauseosus	-	-	-	.63
B	Chrysothamnus viscidiflorus viscidiflorus	34	28	.50	.13
B	Gutierrezia sarothrae	18	12	.03	.04
B	Opuntia spp.	11	7	.05	.00
B	Pediocactus simpsonii	0	1	-	-
B	Pinus edulis	0	7	3.29	4.76
B	Symphoricarpos oreophilus	17	19	.18	1.66
Total for Browse		254	245	20.60	29.47

CANOPY COVER --
Herd unit 11B, Study no: 8

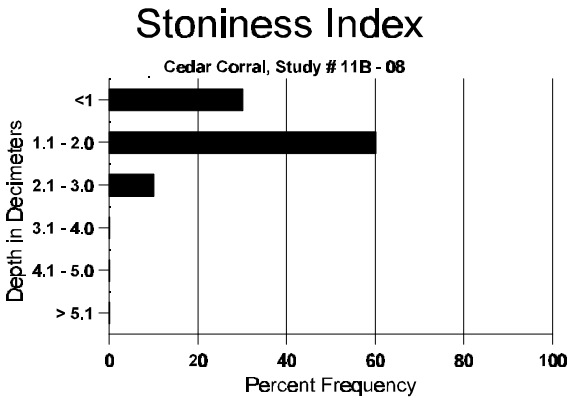
Species	Percent Cover '00
Amelanchier utahensis	1
Pinus edulis	15

BASIC COVER --
Herd unit 11B, Study no: 8

Cover Type	Nested Frequency		Average Cover %		
	'94	'00	'86	'94	'00
Vegetation	323	295	4.50	32.50	37.30
Rock	162	110	8.50	6.57	8.14
Pavement	63	97	1.00	.14	.72
Litter	383	372	50.75	40.25	52.41
Cryptogams	38	64	3.50	.38	1.94
Bare Ground	268	221	31.75	29.77	22.95

SOIL ANALYSIS DATA --
Herd Unit 11B, Study # 8, Study Name: Cedar Corral

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
9.50	64.2 (9.92)	6.6	54.0	25.4	20.6	1.9	4.5	198.4	0.8



PELLET GROUP FREQUENCY --
Herd unit 11B, Study no: 8

Type	Quadrat Frequency		Pellet Transect	
			Pellet Groups per Acre	Days Use per Acre (ha)
	'94	'00	'00	'00
Rabbit	29	14	157	N/A
Horse	2	4	104	N/A
Elk	8	8	131	10 (25)
Deer	16	7	157	8 (20)

BROWSE CHARACTERISTICS --
Herd unit 11B, Study no: 8

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Amelanchier utahensis																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	2	-	-	-	-	-	3	-	-	-	60			3
	00	2	-	-	-	-	-	4	-	-	6	-	-	-	120			6
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	2	-	-	2	-	-	-	-	-	4	-	-	-	80			4
	00	8	-	-	3	-	-	-	-	-	11	-	-	-	220			11
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	22	6	-	-	-	-	-	-	-	28	-	-	-	560	47	59	28
	00	7	7	-	4	2	-	-	-	-	19	-	1	-	400	46	56	20
D	86	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	94	1	1	-	-	-	-	-	-	-	1	-	-	1	40			2
	00	1	2	-	-	1	-	-	-	-	3	-	-	1	80			4
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	+80%
'94	21%	00%	03%	+ 3%
'00	34%	00%	06%	

Total Plants/Acre (excluding Dead & Seedlings)				
'86	133	Dec:	100%
'94	680		6%
'00	700		11%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia nova																		
S	86	9	-	-	-	-	-	-	-	-	9	-	-	-	600			9
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Y	86	21	2	-	-	-	-	-	-	-	23	-	-	-	1533			23
	94	9	2	-	1	-	-	-	-	-	12	-	-	-	240			12
	00	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
M	86	5	2	-	-	-	-	-	-	-	7	-	-	-	466	9	10	7
	94	61	33	9	-	-	-	-	-	-	103	-	-	-	2060	11	17	103
	00	47	25	2	2	-	-	-	-	-	76	-	-	-	1520	10	18	76
D	86	4	2	-	-	-	-	-	-	-	6	-	-	-	400			6
	94	6	5	1	-	-	-	-	-	-	9	-	-	3	240			12
	00	7	2	-	-	-	-	-	-	-	6	-	-	3	180			9
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	280			14
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	200			10

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	17%	00%	00%	+ 6%
'94	31%	08%	02%	-30%
'00	30%	02%	03%	

Total Plants/Acre (excluding Dead & Seedlings)				
'86	2399	Dec:		17%
'94	2540			9%
'00	1780			10%

Artemisia tridentata vaseyana																		
S	86	23	3	-	-	-	-	-	-	-	26	-	-	-	1733			26
	94	4	-	-	2	-	-	-	-	-	6	-	-	-	120			6
	00	6	-	-	-	-	-	-	-	-	6	-	-	-	120			6
Y	86	16	-	-	-	-	-	-	-	-	16	-	-	-	1066			16
	94	34	-	-	1	-	-	-	-	-	35	-	-	-	700			35
	00	14	-	-	-	-	-	-	-	-	14	-	-	-	280			14
M	86	5	-	-	-	-	-	-	-	-	5	-	-	-	333	13	16	5
	94	88	30	-	2	-	-	-	-	-	120	-	-	-	2400	21	31	120
	00	99	21	-	13	-	-	2	-	-	130	5	-	-	2700	17	26	135
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	2	5	-	-	-	-	2	-	-	6	-	-	3	180			9
	00	27	2	-	3	-	-	-	-	-	14	-	-	18	640			32
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	340			17
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	360			18

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	+57%
'94	21%	00%	02%	+ 9%
'00	13%	00%	10%	

Total Plants/Acre (excluding Dead & Seedlings)			
'86	1399	Dec:	0%
'94	3280		5%
'00	3620		18%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Cercocarpus montanus																		
S	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
Y	86	4	2	-	-	-	-	-	-	-	6	-	-	-	400			6
	94	1	-	1	-	-	-	-	-	-	2	-	-	-	40			2
	00	5	-	-	2	-	-	-	-	-	7	-	-	-	140			7
M	86	2	1	-	-	-	-	-	-	-	3	-	-	-	200	15	15	3
	94	7	2	-	2	-	-	-	-	-	11	-	-	-	220	51	51	11
	00	4	5	1	2	1	-	-	-	-	12	-	1	-	260	56	68	13
D	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	1	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	30%	00%	00%	-61%
'94	15%	08%	00%	+38%
'00	33%	05%	05%	

Total Plants/Acre (excluding Dead & Seedlings)				
'86	666	Dec:		10%
'94	260			0%
'00	420			5%

Chrysothamnus depressus

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
S	86	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	86	6	-	-	-	-	-	-	-	-	6	-	-	-	400			6
	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	86	37	-	-	-	-	-	-	-	-	37	-	-	-	2466	4	6	37
	94	60	1	-	1	-	-	-	-	-	62	-	-	-	1240	4	8	62
	00	33	8	-	2	-	-	-	-	-	43	-	-	-	860	4	6	43
D	86	7	-	-	-	-	-	-	-	-	7	-	-	-	466			7
	94	2	3	-	-	-	-	-	-	-	3	-	-	2	100			5
	00	4	-	1	-	-	-	-	-	-	1	-	-	4	100			5
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	-57%
'94	06%	00%	03%	-30%
'00	16%	02%	08%	

Total Plants/Acre (excluding Dead & Seedlings)				
'86	3332	Dec:		14%
'94	1420			7%
'00	1000			10%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus viscidiflorus																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	6	-	-	-	-	-	-	-	-	6	-	-	-	120			6
	00	6	-	-	-	-	-	-	-	-	6	-	-	-	120			6
M	86	7	-	-	-	-	-	-	-	-	7	-	-	-	466	10	7	7
	94	46	-	-	5	-	-	-	-	-	51	-	-	-	1020	9	8	51
	00	25	-	-	4	-	-	-	-	-	29	-	-	-	580	10	9	29
D	86	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	94	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	+37%
'94	00%	00%	02%	-34%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	732	Dec:	27%
	'94	1160		2%
	'00	760		8%

Gutierrezia sarothrae																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	86	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	86	6	-	-	-	-	-	-	-	-	6	-	-	-	400	5	6	6
	94	20	-	-	-	-	-	-	-	-	20	-	-	-	400	5	6	20
	00	17	-	-	1	-	-	-	-	-	18	-	-	-	360	5	6	18
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	1	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	-10%
'94	04%	00%	00%	-17%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	533	Dec:	0%
	'94	480		4%
	'00	400		0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia spp.																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	6	-	-	-	-	-	-	-	-	6	-	-	-	120	3	7	6
	00	4	-	-	1	-	-	-	-	-	5	-	-	-	100	2	4	5
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	4	-	-	-	-	-	-	-	4	-	-	1	100			5
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	25%	00%	06%	-50%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	0%
	'94	320		31%
	'00	160		13%

Pediocactus simpsonii

M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	3	4	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	0		-
	'00	20		-

Pinus edulis

S	86	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	1	-	-	1	-	-	-	20			1
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	2	-	-	2	-	-	-	40			2
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	3	-	-	-	-	-	2	-	-	5	-	-	-	100	-	-	5

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	0		-
	'00	140		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Symphoricarpos oreophilus																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	3	-	-	-	-	-	3	-	-	-	60			3
	00	-	2	-	5	-	-	-	-	-	7	-	-	-	140			7
M	86	2	1	-	-	-	-	-	-	-	3	-	-	-	200	18	25	3
	94	10	-	-	18	1	-	2	-	-	31	-	-	-	620	15	27	31
	00	16	-	-	16	-	-	4	-	-	36	-	-	-	720	8	14	36
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	1	-	-	-	1	-	-	-	20			1
	00	-	-	-	6	-	-	-	-	-	6	-	-	-	120			6

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	33%	00%	00%	+71%
'94	03%	03%	00%	+29%
'00	04%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	200	Dec:	0%
	'94	700		3%
	'00	980		12%

Trend Study 11B-9-00

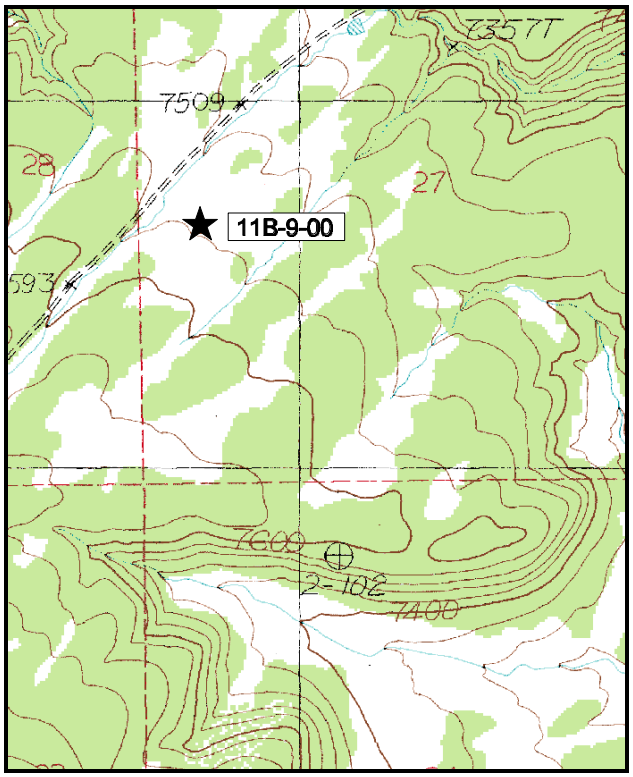
Study site name: Cedar Ridge . Range type: Black Sagebrush .

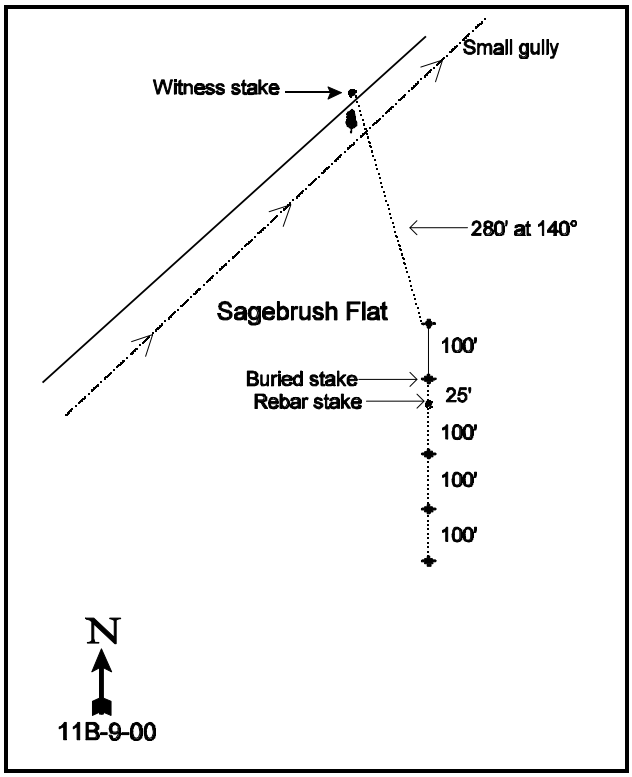
Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From Sunnyside, go up Water Canyon to the summit (Bruin Point). At the summit take the middle fork and go 0.35 miles. Stay right at the fork just beyond a cattle guard and go 0.9 miles. Go through an intersection beyond another cattle guard and go 3.1 miles. Turn left at the fork and continue 2.5 miles to a gate by a cabin. Proceed 3.2 miles, cross a cattle guard and go 5.3 miles on the main road to a fork. Bear right and continue 0.2 miles to a cattle guard. Go 0.5 miles to a major fork. Stay right and keep going 0.4 miles (passing Cottonwood 11B-7) to another fork. Stay on the main road (right) and go 4.8 miles to a junction. Turn left and go 2.7 miles to a "T" intersection. Turn left and go 2.1 miles to a witness post on the left side of the road. The transect starts 280 feet southeast of the witness post across the wash in the sage flat. There is a 25 foot break in the baseline between the end of line 1 and 2. The end of line 1 is marked by partially buried rebar. The rest of the stakes, including the witness post, are green fence posts.





Map Name: Cedar Ridge Canyon

Diagrammatic Sketch

Township 13S , Range 16E , Section 28

UTM. 4390704.622 N, 575697.778 E

DISCUSSION

Trend Study No. 11B-9 (32-13)

This study is located on the wide southwest portion of Cedar Ridge. The area is 6-8 miles east of the Green River. Cedar Ridge is an important concentration area for wintering mule deer, although much of the use occurs on the lower limits of the ridge. The study site is located within an extensive sagebrush park at an elevation of 7,600 feet. This area and surrounding country is basically level, but dissected by numerous deep, intermittent drainages. The area drains to the northeast. The study site has a gentle slope with a northern aspect. The area is used by deer, elk, and a large number of wild horses. Deer pellet groups on the site indicate light use during all readings although several antler drops were found in 1986. A well worn trail passes through the flat. Both cattle and horse droppings were common in 1994, but significant use was not evident. There was also light elk sign observed in 1994. During the 2000 reading, a pellet group transect read along the study site baseline estimates 29 elk and 21 horse days use/acre (71 edu/ha and 52 hdu/ha). No deer pellet groups were encountered but a few were picked up in the quadrats.

The soil is moderately shallow as indicated by the abundance of black sagebrush. A rocky layer is found around 12 to 15 inches in depth which limits deeper soil measurements. Effective rooting depth is estimated at almost 13 inches. The soil has a loam texture with a neutral soil reaction (7.0 pH). Phosphorus is limited at only 5.3 ppm. Values less than 10 ppm have been shown to limit normal plant growth and development. The soil is fairly rocky, but there is little concentration of erosion pavement or rocks on the soil surface. It is loosely compacted with a fair amount of bare soil. Litter and vegetative cover are evenly dispersed and provide adequate soil protection. Some small rills are evident, with an old gully north of the transect along the road. Erosion should not be a problem as long as a high percentage of ground cover comes from herbaceous species.

This open sagebrush park is surrounded by pinyon-juniper woodland. The dominant browse species is black sagebrush as it provides more than 90% of the browse cover. It had an estimated density of 5,733 plants/acre in 1986, and appeared to be expanding with an extremely high number of seedlings. By 1994, the population increased 4-fold to 22,840 plants/acre. It appears that many of the seedlings sampled in 1986 survived to become young plants as half of the population consisted of young plants. Also, the 1994 reading was done with the larger sample size which better estimates shrub populations. Leader growth was good and the plants appeared vigorous. Use was mostly light. The population of black sagebrush increased slightly in 2000 to 25,180 plants/acre. The stand has become increasingly mature (84%), while seedlings and young are still common and mature plants appear to be producing abundant seed. Use continues to be light, vigor good, and decadence low.

Other shrubs present include: dwarf rabbitbrush, rubber rabbitbrush, broom snakeweed, and gray horsebrush. These species make up only a small percent of the browse composition. Junipers appear to be slowly invading the flat, but will not threaten the site for decades. Point-center quarter data from 2000 estimate only 12 pinyon and 11 juniper trees/acre with average diameters of 4.5 inches and 3.4 inches respectively. The surrounding pinyon-juniper stand provides good cover and still maintains a good shrub understory.

Grasses and forbs are moderately abundant and an important component of this site. They not only provide valuable forage, but they also provide excellent protective ground cover. The most abundant species of grasses are needle-and-thread and mutton bluegrass. Bluebunch wheatgrass and thickspike wheatgrass are also fairly abundant. Use of mutton and Sandberg bluegrass appeared fairly heavy in 2000. Forb composition is relatively diverse for this type of site with 24 species of forbs encountered in 1994 and 18 in 2000. Common species include the low growing pussytoes, sulfur eriogonum, mat penstemon, and long-leaf phlox. Lobe-leaf groundsel and scarlet globemallow are also common.

1986 APPARENT TREND ASSESSMENT

The area appears in good health, with a good diversity of species and moderate amounts of forage production for this range type. The sagebrush population is increasing with a very high biotic potential (# of seedlings). Sagebrush provides the bulk of the forage on the site, but the grasses are also vigorous and productive. Invasion by the few increaser woody species and pinyon-juniper is not currently a threat. Therefore, vegetative trend appears stable to improving on this site. The site provides good normal winter range for deer and elk. The soil has excellent protection and although there is the potential for erosion the current trend appears stable.

1994 TREND ASSESSMENT

The area still remains in good health. The trend for soils is up with a significant decrease in percent bare ground (46% to 33%), even with a decrease in nested frequency value for grasses, this was compensated for with an increase in nested frequency for the forbs. The primary browse species is black sagebrush, which makes up 90% of the total browse cover. The population is quite high at 22,840 plants/acre, but 50% of the population is classified as young plants. Percent decadency has declined to only 5% and the browse trend is considered up. The trend for the herbaceous understory is a little confusing because the nested frequency value of grasses has decreased, while the nested frequency for forbs has increased. Nested frequency of grasses and forbs combined have remained fairly stable. Trend for the herbaceous understory is therefore considered stable, but could decline with continued drought.

TREND ASSESSMENT
soil - up (5)
browse - up (5)
herbaceous understory - stable (3)

2000 TREND ASSESSMENT

Trend for soil is slightly improved with decreases in bare soil, increases in litter cover, and improved ratios of protective ground cover (vegetation, litter and cryptogams) to bare ground. There is little erosion occurring due to the level terrain combined with good herbaceous cover. Trend for browse is slightly up. The key species, black sagebrush, has increased in density and nearly doubled in cover. Seedlings and young are still abundant, vigor is good and use light. However, continued increases in density and cover will negatively effect the herbaceous understory. Trend for the herbaceous understory is stable. Sum of nested frequency for grasses and forbs has remained similar to 1994. Nested frequency of the dominant grass, needle-and-thread, declined significantly since 1994, but cover remained similar and several other species of grass increased in nested frequency.

TREND ASSESSMENT
soil - slightly up (4)
browse - up slightly, but becoming too dense (4)
herbaceous understory - stable (3)

HERBACEOUS TRENDS --
Herd unit 11B, Study no: 9

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
G	Agropyron dasystachyum	$_{a}$10	$_{a}$8	66	4	5	26	.02	.81
G	Agropyron spicatum	66	49	61	28	22	22	.86	.51
G	Bouteloua gracilis	$_{a}$30	$_{b}$43	30	10	15	10	2.12	.91
G	Bromus tectorum (a)	-	-	2	-	-	1	-	.00
G	Koeleria cristata	$_{a}$-	$_{b}$25	$_{a}$-	-	11	-	.29	-
G	Oryzopsis hymenoides	$_{a}$-	$_{ab}$3	$_{b}$7	-	1	4	.00	.09
G	Poa fendleriana	$_{b}$190	$_{a}$57	$_{a}$87	81	24	32	.43	2.38
G	Poa secunda	$_{b}$70	$_{a}$8	$_{b}$92	30	3	39	.01	.62
G	Sitanion hystrix	$_{b}$40	$_{a}$21	$_{a}$4	17	8	2	.06	.03
G	Stipa comata	$_{b}$246	$_{b}$269	$_{a}$160	87	88	59	5.36	4.62
Total for Annual Grasses		0	0	2	0	0	1	0	0.00
Total for Perennial Grasses		652	483	507	257	177	194	9.21	9.99
Total for Grasses		652	483	509	257	177	195	9.21	10.00
F	Agoseris glauca	-	-	3	-	-	1	-	.00
F	Antennaria parvifolia	65	87	98	26	35	42	2.59	2.63
F	Arenaria fendleri	-	-	1	-	-	1	-	.00
F	Arabis perennans	$_{b}$10	$_{ab}$3	$_{a}$-	6	2	-	.01	-
F	Astragalus convallarius	$_{b}$12	$_{a}$3	$_{ab}$10	7	1	5	.00	.12
F	Astragalus tenellus	$_{a}$-	$_{b}$12	$_{b}$18	-	5	11	.03	.37
F	Astragalus utahensis	-	3	2	-	1	1	.00	.00
F	Castilleja flava	-	-	9	-	-	4	-	.07
F	Castilleja linariaefolia	$_{b}$23	$_{a}$4	$_{ab}$12	12	2	5	.03	.10
F	Calochortus nuttallii	$_{a}$3	$_{b}$42	$_{a}$7	3	23	3	.11	.01
F	Cryptantha spp.	23	18	30	8	9	16	.15	.28
F	Delphinium nuttallianum	$_{b}$12	$_{a}$-	$_{ab}$2	6	-	2	-	.01
F	Eriogonum alatum	-	2	2	-	1	1	.03	.03
F	Erigeron eatonii	-	2	1	-	2	1	.03	.00
F	Eriogonum umbellatum	29	29	33	15	13	17	.28	.45
F	Hedysarum boreale	$_{a}$-	$_{c}$33	$_{b}$11	-	16	4	.95	.07
F	Heterotheca villosa	-	-	3	-	-	1	-	.00
F	Ipomopsis aggregata	-	-	3	-	-	1	-	.00
F	Lesquerella spp.	-	4	-	-	2	-	.03	-
F	Linum lewisii	-	-	2	-	-	1	-	.03
F	Machaeranthera canescens	-	3	5	-	1	3	.00	.01
F	Machaeranthera grindelioides	5	5	-	3	2	-	.01	-
F	Penstemon caespitosus	35	45	39	16	20	14	.83	.82

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
F	Pedicularis centranthera	a-	b25	a-	-	10	-	.82	-
F	Penstemon humilis	a-	a-	b8	-	-	4	-	.09
F	Penstemon strictus	6	12	11	3	5	6	.05	.03
F	Phlox hoodii	2	4	5	2	2	3	.03	.16
F	Phlox longifolia	60	65	57	28	27	25	.21	.29
F	Senecio multilobatus	46	45	50	22	18	25	.27	.30
F	Sphaeralcea coccinea	a19	b62	a27	8	26	13	.50	.11
F	Townsendia incana	-	-	16	-	-	6	-	.05
F	Trifolium spp.	b11	a-	b6	5	-	4	-	.02
F	Unknown forb-perennial	b20	a-	a-	12	-	-	-	-
F	Vicia spp.	-	1	-	-	1	-	.00	-
Total for Annual Forbs		0	0	0	0	0	0	0	0
Total for Perennial Forbs		381	509	471	182	224	220	7.03	6.14
Total for Forbs		381	509	471	182	224	220	7.03	6.14

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 11B, Study no: 9

Type	Species	Strip Frequency		Average Cover %	
		'94	'00	'94	'00
B	Artemisia nova	100	100	11.60	20.65
B	Artemisia tridentata vaseyana	0	1	-	.15
B	Chrysothamnus depressus	34	41	1.23	.81
B	Chrysothamnus viscidiflorus	2	0	-	-
B	Gutierrezia sarothrae	16	10	.06	.01
B	Juniperus osteosperma	0	1	-	.18
B	Opuntia spp.	2	0	.03	-
B	Pinus edulis	0	2	-	.03
B	Tetradymia canescens	5	5	-	.03
Total for Browse		159	160	12.93	21.87

CANOPY COVER --
Herd unit 11B, Study no: 9

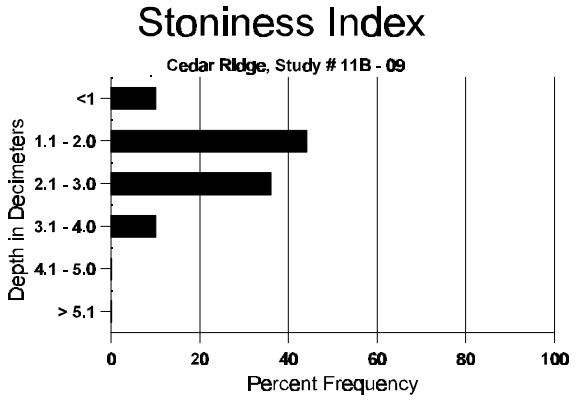
Species	Percent Cover '00
Juniperus osteosperma	.60
Pinus edulis	.20

BASIC COVER --
Herd unit 11B, Study no: 9

Cover Type	Nested Frequency		Average Cover %		
	'94	'00	'86	'94	'00
Vegetation	344	338	7.75	29.64	36.77
Rock	140	35	0	.58	.28
Pavement	168	158	.75	.28	1.68
Litter	389	367	44.50	25.51	43.31
Cryptogams	26	95	.75	.56	2.74
Bare Ground	364	316	46.25	33.27	31.65

SOIL ANALYSIS DATA --
Herd Unit 11B, Study # 9, Study Name: Cedar Ridge

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
12.94	64.6 (11.26)	7.0	47.3	32.2	20.6	2.4	5.3	243.2	0.7



PELLET GROUP FREQUENCY --
Herd unit 11B, Study no: 9

Type	Quadrat Frequency		Pellet Transect	
	'94	'00	Pellet Groups per Acre 00	Days Use per Acre (ha) 00
Rabbit	12	8	9	N/A
Horse	12	3	244	N/A
Elk	5	20	374	29 (71)
Deer	9	4	-	-
Cattle	1	-	-	-
Sage grouse	-	-	9	N/A

BROWSE CHARACTERISTICS --
Herd unit 11B, Study no: 9

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia nova																		
S	86	237	-	-	-	-	-	-	-	-	237	-	-	-	15800			237
	94	96	-	-	-	-	-	-	-	-	96	-	-	-	1920			96
	00	239	-	-	-	-	-	-	-	-	239	-	-	-	4780			239
Y	86	32	3	-	-	-	-	-	-	-	35	-	-	-	2333			35
	94	548	16	-	5	-	-	-	-	-	569	-	-	-	11380			569
	00	101	-	-	-	-	-	-	-	-	99	2	-	-	2020			101
M	86	10	19	1	-	-	-	-	-	-	28	2	-	-	2000	17	17	30
	94	491	28	-	-	-	-	-	-	-	518	-	-	1	10380	14	21	519
	00	924	15	6	29	83	-	-	-	-	1057	-	-	-	21140	9	15	1057
D	86	2	14	5	-	-	-	-	-	-	21	-	-	-	1400			21
	94	29	20	5	-	-	-	-	-	-	27	-	-	27	1080			54
	00	96	-	1	1	3	-	-	-	-	53	-	-	48	2020			101
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	380			19
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	620			31

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	42%	07%	00%	+75%
'94	06%	.43%	02%	+ 9%
'00	08%	.55%	04%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	5733	Dec:	24%
	'94	22840		5%
	'00	25180		8%

Artemisia tridentata vaseyana																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	1	-	-	-	-	-	-	-	-	-	-	-	-	20	6	11	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	0		-
	'00	20		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus depressus																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Y	86	6	-	-	-	-	-	-	-	-	6	-	-	-	400			6
	94	6	-	-	-	-	-	-	-	-	6	-	-	-	120			6
	00	10	-	-	-	-	-	-	-	-	10	-	-	-	200			10
M	86	13	-	-	-	-	-	-	-	-	13	-	-	-	866	4	7	13
	94	179	-	-	-	-	-	-	-	-	179	-	-	-	3580	4	7	179
	00	194	-	-	11	-	-	-	-	-	205	-	-	-	4100	3	8	205
D	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	7	-	-	-	-	-	-	-	-	4	-	-	3	140			7
	00	5	-	-	-	-	-	-	-	-	1	-	-	4	100			5
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	+65%
'94	00%	00%	02%	+13%
'00	00%	00%	02%	

Total Plants/Acre (excluding Dead & Seedlings)				
'86	1332	Dec:		5%
'94	3840			4%
'00	4400			2%

Chrysothamnus nauseosus																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	19	24	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20	21	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'86	0	Dec:	-
'94	0		-
'00	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	1	-	-	1	-	-	-	20	-	-	1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	40		-
	'00	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
S	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	86	5	-	-	-	-	-	-	-	-	5	-	-	-	333			5
	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	86	17	-	-	-	-	-	-	-	-	17	-	-	-	1133	6	4	17
	94	23	-	-	1	-	-	-	-	-	24	-	-	-	480	6	7	24
	00	13	-	-	-	-	-	-	-	-	13	-	-	-	260	4	4	13
D	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	-65%
'94	00%	00%	00%	-44%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	1532	Dec:	4%
	'94	540		0%
	'00	300		0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Juniperus osteosperma																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	1	-	-	-	-	-	-	-	-	-	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	0		-
	'00	20		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia spp.																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80	4	4	4
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	80		-
	'00	0		-

Pinus edulis																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	0		-
	'00	40		-

Tetradymia canescens																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	-	2	-	-	-	-	-	-	-	2	-	-	-	133	11	11	2
	94	5	-	-	-	-	-	1	-	-	6	-	-	-	120	6	9	6
	00	1	2	-	-	-	-	-	-	-	3	-	-	-	60	5	7	3
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	100%	00%	00%	+ 5%
'94	00%	00%	00%	-14%
'00	33%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	133	Dec:	0%
	'94	140		14%
	'00	120		33%

Trend Study 11B-10-00

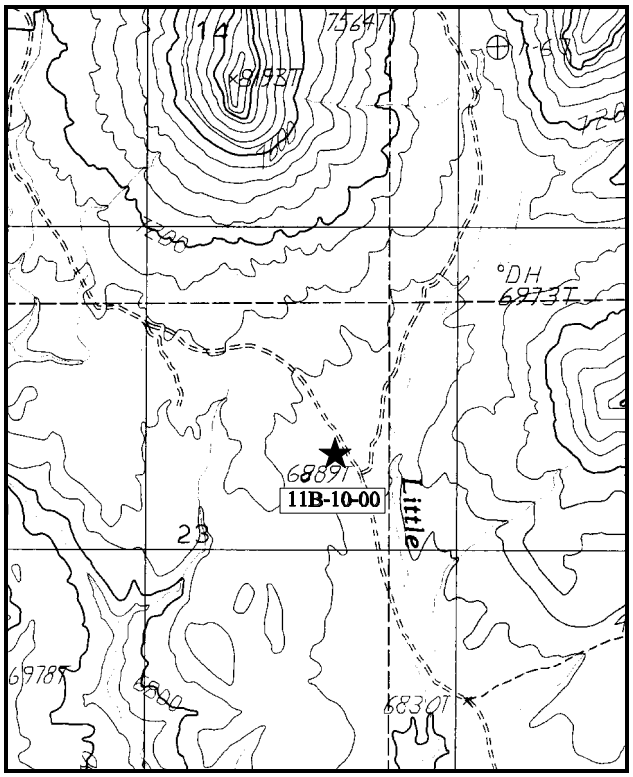
Study site name: Upper Little Park Wash . Range type: Big Sagebrush .

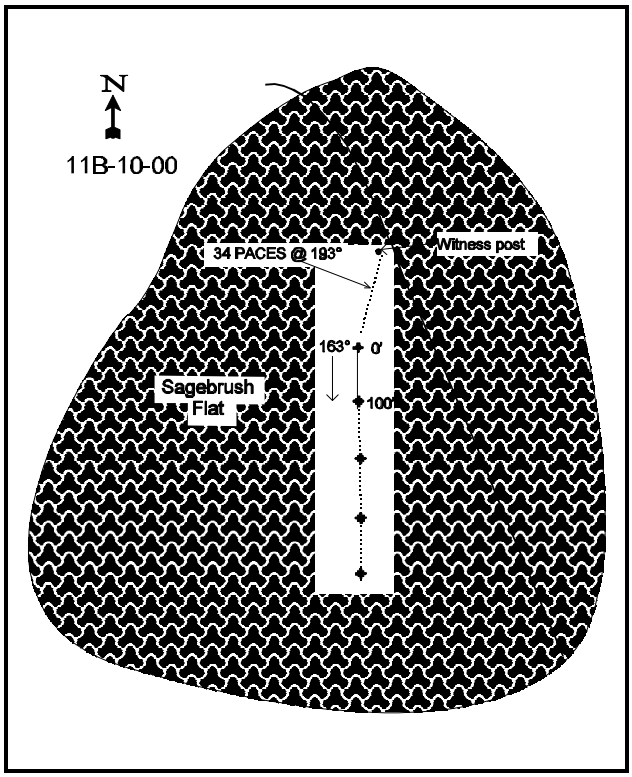
Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From East Carbon City, take SR-124 south for 2.3 miles to a fork with a sign to Horse Canyon Turn right and proceed 6.4 miles to a railroad tresses located above the Geneva Mine buildings. Continue 0.2 miles to another tresses. From this tresses continue up the canyon 0.6 miles. Stay right at the fork and go up 6.85 miles to a witness post on the right side of the road. From the witness post (a green fence post) go 100 feet into the sagebrush on a bearing of 230~ to a fence post with browse tag #7838 attached. This post marks the 0-foot end of the frequency baseline. The rest of the stakes are steel rebar.





Map Name: Lila Point Diagrammatic Sketch

Township 16S , Range 14E , Section 23

DISCUSSION

Trend Study No. 11B-10 (32-14)

***This trend study site was not read in 2000. Text from the 1994 report has been retained in this report. Refer to the 1994 "Utah Big Game Trend Studies" report for maps and data tables.

The Upper Little Park Wash transect is located in critical deer winter range along the west edge of the Book cliffs at an elevation of approximately 7,000 feet. Beyond Little Park, the cliffs drop off abruptly to the low desert floor 800 feet below. The study area is in an open draw filled with basin big sagebrush and many active gullies of various sizes which were distributed throughout the flat. The sagebrush flat is surrounded by pinyon-juniper covered slopes and cliffs. Deer use has generally been moderate with heavier use occurring in hard winters. The nearby pellet group trend transect shows that for the period from 1982-1988, deer use averaged 53 deer days use/hectare/year, which was above average for the herd unit. After 1989 the pellet group transect was no longer read. Use in the area was very light in 1994. The Little Park area has been permitted for 54 cattle from May 26 to October 10, but this particular area is poor for cattle and there was little sign of livestock use in 1986. Since then, in 1992, there was a control burn and seeding in this narrow canyon bottom and associated sagebrush park of basin big sagebrush. Because of the difficulty in getting a good clean burn through the park, a bulldozer bladed the unburned and partially burned sagebrush into the numerous gullies that bisect the sagebrush park. Because of the light fluffy soils, the rangeland drill had difficultly getting the seed at the proper depth causing erratic germination and establishment of the seeded species, for few seeded species showed up in the 1994 readings.

Pressure from people is low and access is difficult during winter and wet conditions. Kaiser Steel has developed mine plans for their south lease on portions of Little Park public land. The development may become a reality if the economic climate is favorable in the future. Restrictions concerning surface occupancy and access into the Little Park winter range are expected (Ashcroft 1983) and would be necessary.

Soil on this gently sloping, southeast-facing site is deep and a light tan-grey color. It appears to contain a high percentage of clay. Small rock fragments are common throughout the profile. Rocks and mud piles are found on the surface, evidence of sedimentation and deposition from the surrounding pinyon-juniper slopes. Some erosion occurs from the site due to the rather sparse understory and bare spots. This has been turned around after the bulldozer treatment and subsequent seedling with a rangeland drill. Before the work was done to the soil surface, pavement cover was almost 10%. After the treatment it is almost zero (.24%). The numerous small gullies, one large active gully, and rills that ran through the sagebrush park are now filled in. Litter cover, since the treatment, declined from 50% to only 27%.

Basin big sagebrush is the key browse species on the site. It was so large and dense in the past that it was difficult to walk through. The average height of mature plants was three and half feet. The large available plants showed light to moderate utilization by deer. Insect damage, in the form of numerous galls and speckled leaves, was evident on some of the plants in 1986. Overall vigor and growth of these plants was only fair in this closed stand which was at an ecological dead end. Density of mature plants was 3,198 plants/acre in 1986 with an estimated cover of 70%. Two years after the treatment, sagebrush density was actually higher at 9,080 plants/acre, but percent cover is now down to about only 2% with 60% of the population classified as young plants. Vigor is good and percent decadency has declined from 65% to 0%.

A few winterfat and saltbush can be found in the area. There has been minimal invasion by junipers into the flat. Junipers on the hillside provide cover and some forage with a few junipers highlined by deer. Resting cover is also good in the flat.

The dense sagebrush overstory in the past had greatly limited species diversity and distribution in the understory which was consequently very sparse. In 1986, cheatgrass prevailed in the small open spaces, while bottlebrush squirreltail, Indian ricegrass and some sheep fescue were found mixed in with the sagebrush. Utilization of grasses by livestock was difficult because of the dense sagebrush. Forbs were also sparse and were unimportant as forage. Since the treatment herbaceous plants dominate the site by providing 92% of the vegetation cover. As mentioned earlier, seeded species have not established very well but many seeded species were encountered during the 1994 reading. Cheat grass dominated the herbaceous understory and provides 67% of the herbaceous cover. Seeded and native perennial species will hopefully increase on the site.

Forbs are also dominated by annuals. The only seeded forb encountered was Lewis flax which had a quadrat frequency of only 6%. The most common forbs on the site are Russian thistle and annual stickseed.

1986 APPARENT TREND ASSESSMENT

Erosion and sedimentation are active forces on this site, leading to an apparent downward soil trend. Basin big sagebrush, the key browse species, has a high density, over-mature population that will probably experience continued decadence. There are abundant seedlings for replacement however, with a continued population turnover, it will eventually result in increased production. Range trend is considered to be stable. The lack of diversity in the herbaceous component does not indicate a healthy site, but is not critical in terms of deer winter range. An increase in the herbaceous vegetation would constitute a habitat improvement for deer that also use the area in the spring and fall. A patchy spring burn would open up the stand and offer an opportunity to seed species that would provide early green-up in the spring and valuable regrowth in the fall.

1994 TREND ASSESSMENT

Active erosion and sedimentation are no longer a problem after the burn and seeding treatment. Percent bare ground has increased slightly, but there is a better distribution of plant and litter cover. Ninety-two percent of the plant cover is contributed by the herbaceous species which is also more protective of the soils, therefore soil trend at this time would be considered improving. The browse trend is up because of the younger population which, as they become more mature, will be much more productive and vigorous for a critical winter range. The trend for the herbaceous understory is mixed. Nested frequency of herbaceous plants have increased nearly four fold since the treatment. However, 90% of the grass cover is now cheatgrass and 92% of the forb cover is made up of annuals. Through time, this should turn around as the perennial species become more dominant over the less desirable annual species. The area is now very susceptible to fire because of the prevalence of annual species. Nested frequency of perennial grasses and forbs is nearly the same as before the treatment. Due to the dominance of annuals, trend for herbaceous understory is
down.

TREND ASSESSMENT
soils - stable to improving (4)
browse - up (5)
herbaceous understory - down because of the dominance of annual species (1)

Trend Study 11B-11-00

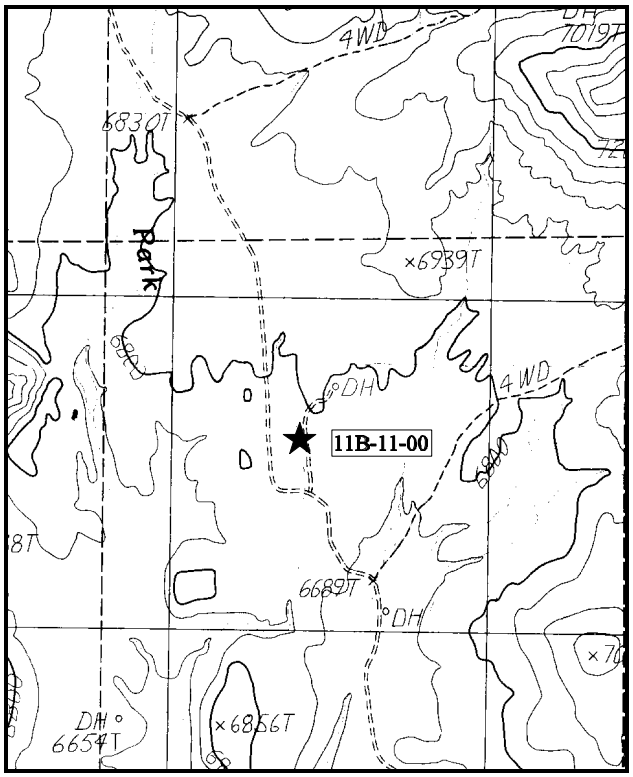
Study site name: Little Park Exclosure . Range type: Big Sagebrush-Grass .

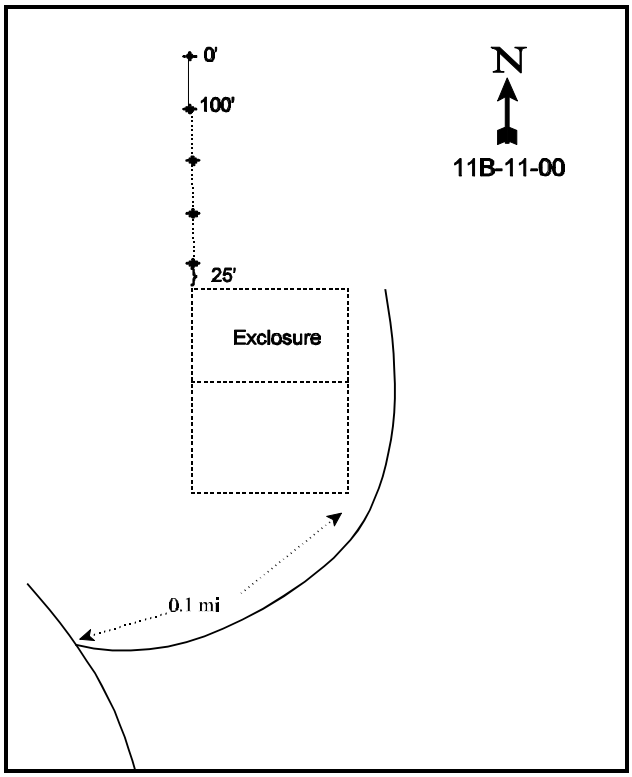
Compass bearing: frequency baseline 165°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the intersection of U-124 ant the cutoff to Highway 6 travel up Horse Canyon 1.8 miles to a fork. Stay right and continue 8.2 miles to a fork on the left (east). Turn left and drive 0.1 miles to the northeast corner of the exclosure. Walk to the northwest corner of the exclosure to find the 400 foot stake 25 feet to the north. The other stakes, all rebar, are 100 feet apart. The stake at the 0-foot end of the baseline is marked with browse tag #7855.





Map Name: Lila Point Diagrammatic Sketch

Township 16S , Range 14E , Section 25 UTM. 4361785.313 N, 559566.032 E

DISCUSSION

Trend Study No. 11B-11 (32-15)

The Little Park Exclosure study samples the sagebrush-grass vegetation type which provides critical winter range for deer in the Little Park area. This study site is in a small sagebrush opening surrounded by pinyon and juniper, which are spreading into the flat. The site has a gentle 2-3% slope with a southern aspect and an elevation of 6,800 feet. The transect was set up near the BLM's Little Park exclosure. Deer use appears light with a nearby pellet group transect averaging only 10 deer days use/acre (24 ddu/ha) between 1984-85 and 1989-90. Between 1990-91 and 1993-94, the number of deer days use declined to an average of only 5 (11 ddu/ha). This shows the continuing downward trend for deer use in the area. A pellet group transect read parallel to the trend study site baseline in 2000, estimated only 2 deer days use/acre (5 ddu/ha). However, rabbit pellets were very abundant. There was frequent sign of cattle and horses in the vicinity in 1986, but there was no sign of cattle grazing in 2000. The area is part of the BLM Little Park grazing allotment which is used as summer and fall range.

The reddish loam soil is moderately deep and loosely compacted on the surface. Effective rooting depth is estimated at just over 13 inches with a compacted hardpan at 6 to 7 inches in depth. Percent organic matter is low at just 1.3%. Phosphorus is also limited at only 4.5 ppm, where values less than 10 ppm may limit normal plant growth and development. There are few rocks or pavement on the surface or within the profile. Although the sagebrush and grass cover appears fairly dense, nearly half of the surface is bare soil. Erosion is taking place as evidenced by three small, but fairly deep gullies, and one large gully in the area. Also, soils are pedestaled around shrubs and bunch grasses.

The dominant browse species on this site is mountain big sagebrush with an estimated density of 2,800 plants/acre in 1986 and 2,780 in 2000. Mature plants are, on average, about two feet tall. Thirty-eight percent of the plants were heavily hedged in 1986, but use was mostly light in 1994 and 2000. The population has remained stable with respect to density since 1986, and although use has declined considerably since then, percent decadency has increased (29% in 1986 to 50% in 2000). Furthermore, the proportion of plants displaying poor vigor has steadily increased (0% in 1986 to 24% in 1994 and 2000). Some of the vigor problems with sagebrush vigor appear to be partly due to competition with the abundant perennial grass understory. Grass cover has increased since 1994 from 14% to 21%. Another factor is the increasing pinyon-juniper overstory. Point-center quarter data from 2000 estimate 22 pinyon and 16 juniper trees/acre with average diameters of 2.4 and 3.4 inches respectively. However, shrub density strip data, which is more effective at estimating seedling and young tree density, estimates 240 pinyon and 100 juniper trees/acre. Very dry conditions in 2000 have obviously added to the problem with sagebrush health and vigor. Leader growth and seed production are currently (‘00) poor.

Another preferred browse, winterfat, is present in low numbers (100 to 120 plants/acre). The population consists entirely of small mature plants which receive constant use. The only other abundant shrub is the increaser broom snakeweed which has increased in density from 260 plants/acre in 1994 to 900 plants/acre in 2000.

Perennial grasses are large, vigorous, and well established. Western wheatgrass, Salina wildrye, and needle-and-thread produce the most forage. Over 50% of the total vegetative cover is provided by grasses. The low-growing, warm season blue grama grass is also fairly abundant in scattered patches. It was so dry during the summer of 2000 that blue grama did not produce seed. It appears that Salina wildrye was not identified correctly in 1994 and was lumped with western wheatgrass. Currently (‘00), Salina wildrye provides 61% of the grass cover.

Forbs are rather inconspicuous on the site, although 10 different species were encountered in 1986. Most are small and occur infrequently. The more common species, long-leaf phlox and tumblemustard, are generally considered increasers with little forage value, especially on winter range.

1986 APPARENT TREND ASSESSMENT

The vegetative trend on the site appears stable. The key browse species, mountain big sagebrush, is vigorous and recruitment is adequate. There is a good balance with herbaceous vegetation. The threat to this site comes in the form of increasing pinyon and juniper which could significantly affect the amount of quality winter browse available. Although encroachment appears rapid, it takes several decades to form a closed canopy. Considering the importance of these openings, management objectives might include some type of pinyon-juniper removal. Although prone to erosion, the soil trend currently appears stable with increased litter and vegetative cover.

1994 TREND ASSESSMENT

The trend for soils is stable to slightly improving with a decrease in percent bare ground. More importantly, the herbaceous understory provides more than 60% of the total vegetational cover which gives much better protection to the soil than that of overstory cover. Tree canopy cover cannot protect the soils effectively from high intensity summer storm events. The browse trend is slightly down. The key browse species, mountain big sagebrush, has an almost unchanged population, but percent decadency has increased substantially (29% to 49%), and plants considered in poor vigor has increased (0% to 24%). Almost one plant in three were dead in 1994. All this points to a decreasing population. The only positive statistic for sagebrush is that the biotic potential (# of seedlings) is at 8%, which is good for sagebrush. This trend is most likely caused by the extended drought as use has decreased since 1986. The trend for the herbaceous understory is up for grasses and down for forbs. Combined sum of nested frequency of grasses and forbs has remained similar.

TREND ASSESSMENT
soil - stable to slightly improving (4)
browse - slightly down (2)
herbaceous understory - stable (3)

2000 TREND ASSESSMENT

Trend for soil continues to improve. Percent cover of bare ground has declined, while vegetative and litter cover have increased. In addition, cryptogamic cover has increased dramatically from 2% in 1994 to 15% in 2000. There is still some erosion occurring as evidenced by small active gullies around the site. Trend for the key browse species, mountain big sagebrush, continues to be slightly down. Density is still fairly stable and use is mostly light. However, percent decadence continues to be high (50%) and the proportion of plants displaying poor vigor remains high at 24%. In addition, nearly half of the decadent sagebrush sampled appear to be dying (680 plants/acre) and there are currently not enough young to replace them. This decline does not appear to be the result of use. Sagebrush in the nearby exclosure appear to have similar decadency and vigor problems which are likely due to competition with grasses and trees combined with many years of drought. A return to normal precipitation patterns will do much to reverse this trend. Trend for the herbaceous understory is mixed. Sum of nested frequency and cover of perennial grasses have increased, while nested frequency of forbs has declined. Since grasses make up a majority of the herbaceous cover, the herbaceous trend is considered up slightly.

TREND ASSESSMENT
soil - up slightly (4)
browse - slightly down (2)
herbaceous understory - up slightly (4)

HERBACEOUS TRENDS --
Herd unit 11B, Study no: 11

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'86	'94	'00	'86	'94	'00	'94	'00
G	Agropyron smithii	$_{b}$237	$_{ab}$223	$_{a}$162	83	73	60	10.46	5.23
G	Agropyron spicatum	-	-	6	-	-	2	-	.53
G	Bouteloua gracilis	$_{a}$16	$_{b}$37	$_{a}$12	6	13	6	.50	.98
G	Bromus japonicus (a)	-	-	3	-	-	1	-	.38
G	Elymus salina	$_{a}$-	$_{a}$-	$_{b}$141	-	-	52	-	12.75
G	Oryzopsis hymenoides	11	12	3	5	7	2	.23	.01
G	Poa fendleriana	$_{a}$-	$_{b}$56	$_{b}$48	-	26	19	2.58	.66
G	Poa secunda	-	-	1	-	-	1	-	.00
G	Sitanion hystrix	1	3	-	1	1	-	.03	.00
G	Stipa comata	8	4	14	6	1	7	.00	.33
Total for Annual Grasses		0	0	3	0	0	1	0	0.37
Total for Perennial Grasses		273	335	387	101	121	149	13.82	20.52
Total for Grasses		273	335	390	101	121	150	13.82	20.89
F	Astragalus convallarius	$_{b}$30	$_{b}$29	$_{a}$4	13	14	2	.65	.06
F	Cryptantha fulvocanescens	$_{b}$31	$_{b}$26	$_{a}$-	15	13	-	.48	-
F	Hedysarum boreale	2	-	-	1	-	-	-	-
F	Hymenoxys richardsonii	$_{a}$1	$_{a}$1	$_{b}$16	1	1	9	.00	.34
F	Orobanche spp.	3	-	-	1	-	-	-	-
F	Phlox hoodii	3	-	1	1	-	1	-	.00
F	Phlox longifolia	$_{c}$207	$_{b}$150	$_{a}$50	78	56	23	.73	.16
F	Schoencrambe linifolia	$_{b}$18	$_{a}$6	$_{a}$1	11	3	1	.02	.00
F	Sisymbrium altissimum (a)	-	-	8	-	-	3	-	.33
F	Sphaeralcea coccinea	$_{b}$19	$_{b}$11	$_{a}$-	11	4	-	.07	-
F	Unknown forb-perennial	1	-	-	1	-	-	-	-
Total for Annual Forbs		0	0	8	0	0	3	0	0.32
Total for Perennial Forbs		315	223	72	133	91	36	1.96	0.57
Total for Forbs		315	223	80	133	91	39	1.96	0.90

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 11B, Study no: 11

Type	Species	Strip Frequency '94	Strip Frequency '00	Average Cover % '94	Average Cover % '00
B	Artemisia tridentata vaseyana	71	73	9.33	11.33
B	Ceratoides lanata	5	5	.00	-
B	Chrysothamnus viscidiflorus viscidiflorus	0	1	-	-
B	Gutierrezia sarothrae	4	15	.31	.10
B	Juniperus osteosperma	0	5	.04	.59
B	Leptodactylon pungens	0	2	-	.38
B	Opuntia spp.	5	7	.15	.18
B	Pinus edulis	0	9	-	1.29
Total for Browse		85	117	9.84	13.89

CANOPY COVER --
Herd unit 11B, Study no: 11

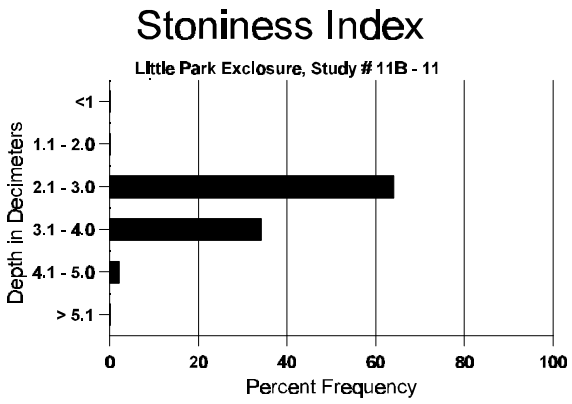
Species	Percent Cover '00
Juniperus osteosperma	.80
Pinus edulis	2

BASIC COVER --
Herd unit 11B, Study no: 11

Cover Type	Nested Frequency '94	Nested Frequency '00	Average Cover % '86	Average Cover % '94	Average Cover % '00
Vegetation	321	298	7.75	25.00	35.85
Rock	92	8	.50	1.13	.16
Pavement	82	59	.75	1.41	.75
Litter	380	353	33.00	17.77	35.97
Cryptogams	99	231	4.25	1.75	14.98
Bare Ground	350	348	53.75	47.12	41.02

SOIL ANALYSIS DATA --
Herd Unit 11B, Study # 11, Study Name: Little Park Exclosure

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
13.62	63.2 (12.68)	7.4	46.0	29.4	24.6	1.3	4.5	166.4	0.5



PELLET GROUP FREQUENCY --
Herd unit 11B, Study no: 11

Type	Quadrat Frequency		Pellet Transect	
	'94	'00	Pellet Groups per Acre '00	Days Use per Acre (ha) '00
Rabbit	37	46	1862	N/A
Elk	-	1	-	-
Deer	31	6	26	2 (5)
Cattle	1	-	-	-

BROWSE CHARACTERISTICS --
Herd unit 11B, Study no: 11

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
S	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	94	11	-	-	-	-	-	-	-	-	11	-	-	-	220			11
	00	1	-	-	2	-	-	-	-	-	3	-	-	-	60			3
Y	86	2	1	3	-	-	-	-	-	-	6	-	-	-	400			6
	94	7	-	-	-	-	-	-	-	-	7	-	-	-	140			7
	00	7	-	-	4	-	-	-	-	-	11	-	-	-	220			11
M	86	11	8	5	-	-	-	-	-	-	24	-	-	-	1600	22	22	24
	94	52	14	-	-	-	-	-	-	-	66	-	-	-	1320	22	36	66
	00	44	14	1	-	-	-	-	-	-	59	-	-	-	1180	21	33	59
D	86	2	1	8	-	1	-	-	-	-	12	-	-	-	800			12
	94	39	14	17	-	-	-	-	-	-	35	-	-	35	1400			70
	00	33	27	2	5	2	-	-	-	-	35	-	-	34	1380			69
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	860			43
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	1080			54

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	26%	38%	00%	+ 2%
'94	20%	12%	24%	- 3%
'00	31%	02%	24%	

Total Plants/Acre (excluding Dead & Seedlings)				
'86	2800	Dec:		29%
'94	2860			49%
'00	2780			50%

Ceratoides lanata																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	3	-	-	1	1	-	-	-	-	5	-	-	-	100	10	9	5
	00	4	1	1	-	-	-	-	-	-	6	-	-	-	120	9	7	6

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	20%	00%	00%	+17%
'00	17%	17%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'86	0	Dec:	-
'94	100		-
'00	120		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus viscidiflorus																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	8	18	0
	00	2	-	-	-	-	-	-	-	-	-	-	2	-	40	-	-	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	100%	

Total Plants/Acre (excluding Dead & Seedlings)			Dec:	
	'86	0		-
	'94	0		-
	'00	40		-

Gutierrezia sarothrae																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	1	-	-	-	-	-	-	-	-	1	-	-	-	66	11	6	1
	94	10	-	-	-	-	-	-	-	-	10	-	-	-	200	7	9	10
	00	41	-	-	-	-	-	-	-	-	41	-	-	-	820	6	7	41
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	3	-	-	-	-	-	-	-	-	2	-	-	1	60			3
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	+75%
'94	00%	00%	00%	+71%
'00	00%	00%	02%	

Total Plants/Acre (excluding Dead & Seedlings)			Dec:	
	'86	66		0%
	'94	260		0%
	'00	900		7%

Juniperus osteosperma																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60	-	-	3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			Dec:	
	'86	0		-
	'94	0		-
	'00	100		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Leptodactylon pungens																		
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	4	-	-	-	-	-	-	-	-	4	-	-	-	80	5	10	4

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	0		-
	'00	80		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia spp.																		
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	5	-	-	-	-	-	-	-	-	5	-	-	-	100	4	16	5
	00	5	-	-	-	-	-	-	-	-	5	-	-	-	100	3	8	5
D	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
	00	2	-	-	-	-	-	-	-	-	-	-	-	2	40			2
X	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'86	00%	00%	00%	
'94	00%	00%	00%	+25%
'00	00%	00%	25%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	0%
	'94	120		17%
	'00	160		25%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Pinus edulis																		
S	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	2	-	-	-	-	-	2	-	-	4	-	-	-	80			4
Y	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	5	-	-	1	-	-	-	-	-	6	-	-	-	120			6
M	86	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	6	-	-	-	-	-	-	-	-	6	-	-	-	120	-	-	6

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'86	00%	00%	00%
'94	00%	00%	00%
'00	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'86	0	Dec:	-
	'94	0		-
	'00	240		-

Trend Study 11B-12-00

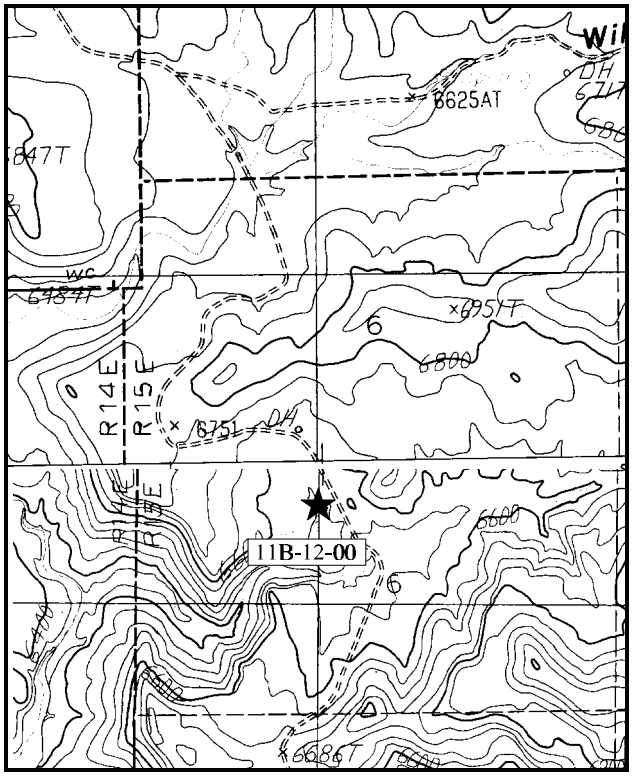
Study site name: Williams Draw . Range type: Mixed Mountain Brush .

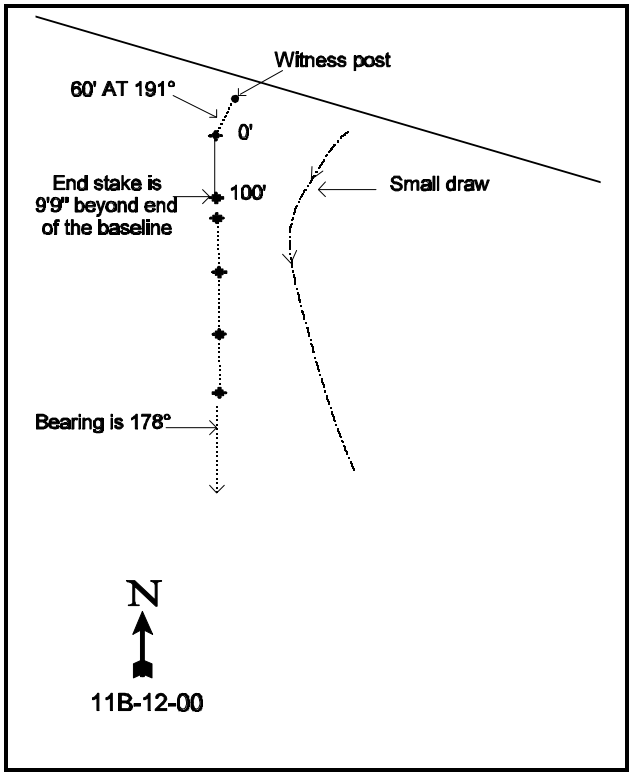
Compass bearing: frequency baseline 168°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the Geneva coal mine at the mouth of Horse Canyon, go 0.6 miles past the buildings to a fork. Bear right and proceed 6.85 miles up on top to the Upper Little Park Wash transect. Pass this transect and continue 1.35 miles to the fork at the Little Park Deer Exclosure sign. Continue on the main road for 1.45 miles to the "Williams Draw Spring" sign. Stay right and proceed 1.1 miles to a witness post (green fence post tagged #7836) located down off the right side of the road. From the witness post, walk 60 feet south (191°) down the slope to the start of the baseline, which is marked by a 2-foot tall rebar post. The rebar stake at the end of the baseline is actually 9 feet 9 inches past the 100-foot end of the tape. The first density plot is 49 feet bearing 76° from the baseline end stake.





Map Name: Woodside Diagrammatic Sketch

Township 17S , Range 15E , Section 6

DISCUSSION

Trend Study No. 11B-12 (32-16)

*** This trend study site was not read in 2000. Text from the 1994 report has been retained in this report. Refer to the 1994 "Utah Big Game Trend Studies" report for maps and data tables.

The Williams Draw study is located in a pinyon-Juniper mixed mountain brush type on the southern end of the Little Park area. Aspect is easterly with an elevation of 6,500 feet. The moderately sloping, rolling land drains to the south and east into Little Park Wash. It is surrounded by rocky broken cliffs to the west and north. Water can be found nearby at Williams Draw Spring. While there is no sign of a continuous fire, numerous lightening strikes have hit the large conifers. The pinyon and juniper provides excellent cover for big game. Deer pellet groups are common, especially around the cliffrose. There are almost twice as many rabbit pellet groups as deer on this site. There appears to be little livestock use, not surprising with a total herbaceous cover of less than 1%.

There is a predominance of the pinkish-white sandstone bedrock which creates a rocky and somewhat shallow site. However, there are depressions and cracks in the rocks which provides small areas of moderately deep loose soil with an associated build-up of litter and loose sand underneath the trees and shrubs. The soil is composed mainly of sand and is very shallow in most places. There is good development of cryptogams within protected micro sites. Vegetative cover is low, especially from the herbaceous understory, but bare soil is only at 12%. This situation leads to naturally occurring erosion and sedimentation with the high amounts of slick-rock cover often associated with high intensity summer storms. Except for in the larger washes, erosion doesn't appear to be a factor in plant establishment, as many are growing in the numerous small gullies.

Large old juniper and pinyon characterize this woodland site with respective densities of 246 and 274 trees/acre. Average basal diameter of pinyon is about 5 inches, while that of juniper is just over 9 inches. About 40% of the pinyon's are less than one inch in diameter. There is light utilization of the available juniper. The key browse species for the site is true mountain mahogany, curlleaf mountain mahogany, and cliffrose. The cliffrose is quite vigorous and moderately hedged, but about half of the plants are 7-8 feet tall and new growth is largely unavailable. There has been a severe high lining effect from heavy utilization on some of the plants. Curlleaf mahogany, an evergreen shrub, has been heavily hedged and appears less vigorous than the true mountain mahogany, but this would be expected at this elevation for the curlleaf mountain mahogany does better at higher elevations and the extended drought would be more detrimental to a plant growing on a marginal site. There are also some littleleaf mountain mahogany and vigorous hybrids in the population in the area. There are scattered seedlings of most all these palatable species. Other utilized browse species include green ephedra, snowberry, and to a lesser extent serviceberry. None of these desirable species are particularly abundant, but together the 6 species provide a fair amount of forage and a total density of 860 shrubs/acre. The most commonly encountered key browse species was green ephedra with 480 plants/acre.

Due to the poor soil and moderately dense pinyon-Juniper overstory, the herbaceous component is limited on this site. Grasses are very sparse, with a few individuals of bottlebrush squirreltail, Indian ricegrass and blue grama. They provide very limited forage and little soil protection. A variety of forbs, mainly composites, are found on the site. Forb quadrat frequency is low and the small, low-growing plants provide only minimal forage potential. All the herbaceous species together provide less than one percent of the vegetative cover.

1986 APPARENT TREND ASSESSMENT

Compared to most shallow, rocky, pinyon-juniper sites, this one is especially healthy and diverse for browse species. The several valuable browse species are generally vigorous, although density overall is low. There is

some recruitment for the browse species. Browse utilization appears moderate and sustainable. Therefore, vegetative trend is stable. Although total ground cover is poor, the soil has a well-developed cryptogam cover and litter build-up is increasing. It is reasonable to always expect some erosion on this type of site. Soil trend is stable.

1994 TREND ASSESSMENT

When compared to other slick-rock pinyon-juniper woodlands, 12% bare ground and over 40% litter cover is excellent. Trend for soils is stable. The browse trend is also stable with a good variety of shrub species and most having good numbers of young plants. The percent decadence for most browse species has improved, but is still moderately high for a few species. This site is very limiting with the shallow restricted soils in association with the extended drought for so many years. The herbaceous understory is almost non-existent (<1%). Trend is stable for perennial species, but overall it is poor for herbaceous species.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - stable for perennial species, but overall poor abundance (3)

Trend Study 11B-14-00

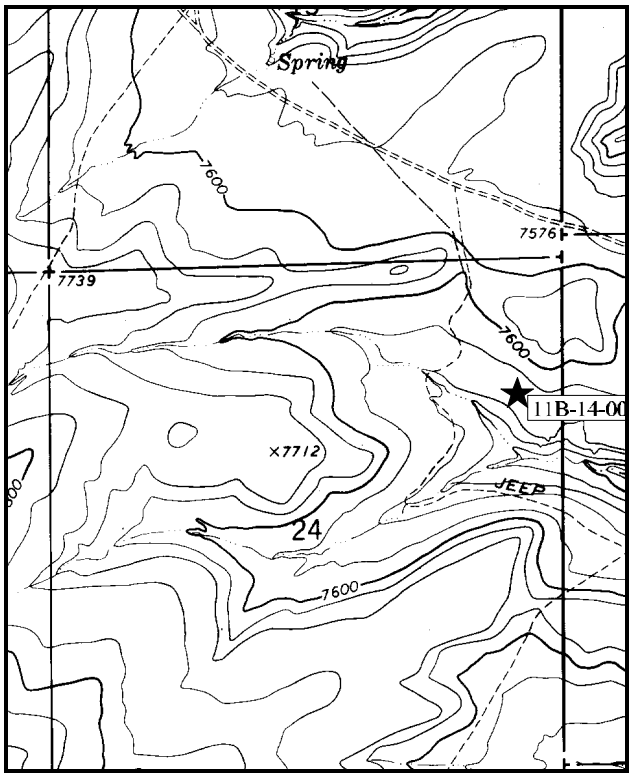
Study site name: Prickly Pear . Range type: Chained, Seeded P-J .

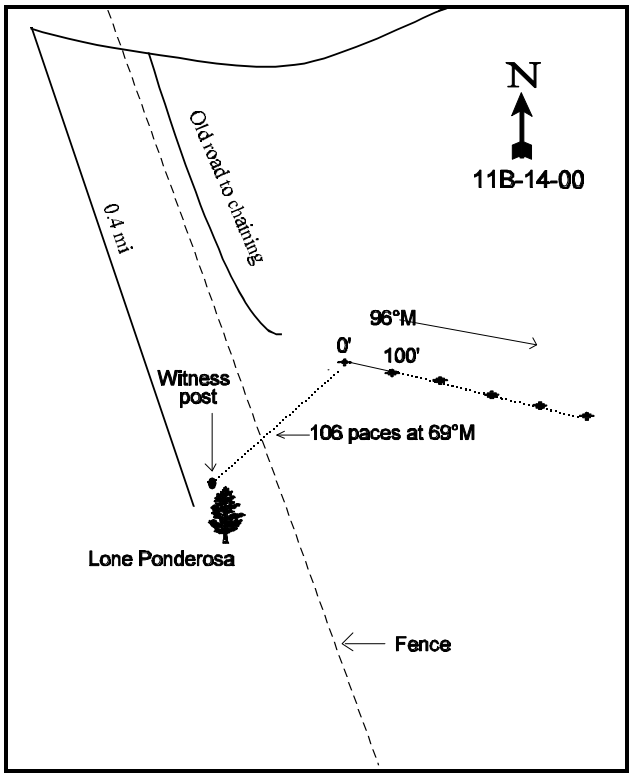
Compass bearing: frequency baseline 96°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft). No Rebar on belts.

LOCATION DESCRIPTION

In Wellington at the intersection of Highway 6 and Nine Mile Canyon Road drive 42 miles northeast down Nine Mile Canyon to the Prickly Pear turnoff. Turn right (south) and travel up Prickly Pear Canyon 7.5 miles to a fork just beyond a fence. Turn south (left) and travel 0.4 miles to a large Ponderosa pine tree on the east side of the road. A witness post is just north of the tree. From the witness post walk 106 paces at 69°M crossing the fence to the 0 foot base line post. The base line runs at an azimuth of 96°M.





Map Name: Currant Canyon Diagrammatic Sketch

Township 12S , Range 14E , Section 24 UTM. 4401517.367 N, 560898.939 E

DISCUSSION

Trend Study No. 11B-14 (32-20)

The Prickly Pear study was established in 1994, and is located at the head of Prickly Pear Canyon at 7,540 feet in elevation on a southwest aspect. The transect is near the edge on a slightly sloping flat narrow ridge that runs west to east into Nine-Mile Canyon. It was not selected necessarily because of current elk use, but for the anticipated increase in elk use in the coming years. The importance of the site to elk is evidenced by a pellet group frequency in 1994 of 21% compared to only 8% for deer. Pellet group frequency was much lower in 2000, perhaps due to the mild winter of 1999-2000. A pellet group transect taken along the study site baseline in 2000 estimates 22 elk, 9 cow and 8 horse days use/acre (54 edu/ha, 23 cdu/ha and 20 hdu/ha). No deer pellet groups were encountered. The area was chained and seeded in the mid-1970's and is currently grazed by livestock as part of the Stone Cabin allotment which is grazed on a deferred rotation schedule from May through September. Herbaceous production is poor and grasses on the site were heavily utilized by livestock in 2000.

The soil is moderately deep and rocky with an estimated effective rooting depth of just over 14 inches. It has a clay loam texture with slightly alkaline pH of 7.6. Phosphorus is limited at just 2 ppm, as values less than 10 ppm have been shown to limit normal plant growth and development. Small shale fragments and larger flat pieces of sandstone are common on the surface and throughout the soil profile. Combined rock and pavement produced 22% cover in 1994 and 30% cover in 2000. Percent cover of bare ground is high and litter cover is low, with most litter coming from pinyon and juniper debris from the chaining. Some erosion is taking place but it is minimized by the slight slope combined with the armored nature of the soil surface.

Browse is very limited on this site with browse cover values of only 3% in 1994 and 5% in 2000. Total vegetative cover is not very high at only 12% to 13%. Similar sites have on average more than twice the vegetative cover as the Prickly Pear site. The herbaceous understory is also limited with a cover value of only about 9%. Site potential appears to be low when compared to other comparable sites within the Range Creek unit. Key browse on this site consist of small numbers of true mountain mahogany and rubber rabbitbrush. Mahogany is estimated at 220 plants/acre in 2000 with over half of the population showing moderate to heavy use on both readings. Even with moderate to heavy use, vigor is good. No seed was produced in 2000 likely due to the extremely dry conditions. Rubber rabbitbrush also has a relatively small population (480 plants/acre in 1994 and 320 in 2000). They were heavily utilized in 1994. However, current (‘00) use is mostly light to moderate. The most common shrub on the site is corymbed eriogonum with a density of around 2,000 plants/acre. These shrubs show little use.

Released pinyon and juniper trees are growing back within the chaining. Point-center quarter data from 2000 estimate 92 pinyon and 31 juniper trees/acre. Most trees are small with an average basal diameter estimated at 3.3 inches for pinyon and 3.6 inches for juniper. Five percent of the juniper trees sampled were mature chained trees that are still alive.

The herbaceous understory is poor, producing only 9% cover. The only fairly common grasses include Salina wildrye and crested wheatgrass which produce over 80% of the meager grass cover. Forbs are diverse but the only common species are indicative of shallow soil. The most common species include: stemless goldenweed, fineleaf hymenopappus, bladderpod, gumweed aster and desert phlox. There is little useful forage produced by these forbs.

1994 APPARENT TREND ASSESSMENT

Soil trend appears to be in stable, but poor condition, with a high percentage of bare ground and rock, and a low cover value for litter. The browse component is poor with very low densities and poor vigor. The herbaceous

understory has one of the lowest cover values for this kind of site, but it still has a fair amount of grass production from Salina wildrye and crested wheatgrass. Because of the low abundance for both crested wheatgrass and smooth brome, both seeded when this woodland was chained, this low density could mostly be explained because of the prolonged drought we have had in the past 8 years.

2000 TREND ASSESSMENT

Trend for soil is stable, but remains in poor condition. Relative cover values for vegetation, litter, and bare ground are similar to 1994 estimates. There is some erosion occurring but it is minimized by the gentle terrain combined with the armored nature of the soil surface. Trend for browse is also stable. Density of desirable browse species, mountain mahogany and rabbitbrush, are low yet stable. Vigor is generally good and percent decadence low. Density of other less desirable shrubs on the site also appear to be stable. The only negative aspect of the browse trend is the number of pinyon and juniper trees released on the chaining. They are not currently abundant and do not produce much cover, but they will eventually regain dominance of the site, especially without a vigorous herbaceous understory. Trend for the herbaceous understory is down slightly due to a decline in the sum of nested frequency of both grasses and forbs.

TREND ASSESSMENT
soil - stable, but poor condition (3)
browse - stable (3)
herbaceous understory - declining slightly with continued drought (2)

HERBACEOUS TRENDS --
Herd unit 11B, Study no: 14

Type	Species	Nested Frequency '94	Nested Frequency '00	Quadrat Frequency '94	Quadrat Frequency '00	Average Cover % '94	Average Cover % '00
G	Agropyron cristatum	69	62	23	24	1.30	1.31
G	Agropyron spicatum	-	*9	-	3	-	.33
G	Bromus inermis	5	*-	3	-	.01	-
G	Carex spp.	13	11	7	4	.25	.45
G	Elymus salina	128	118	43	40	3.40	2.82
G	Oryzopsis hymenoides	2	2	1	2	.00	.03
G	Stipa comata	7	-	2	-	.01	-
G	Stipa lettermani	3	-	1	-	.03	-
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		227	202	80	73	5.03	4.96
Total for Grasses		227	202	80	73	5.03	4.96
F	Antennaria rosea	-	5	-	2	-	.01
F	Arenaria fendleri	3	-	2	-	.03	-
F	Castilleja spp.	2	-	1	-	.00	-
F	Draba spp. (a)	-	3	-	1	-	.00
F	Euphorbia spp.	10	*-	4	-	.02	-
F	Haplopappus acaulis	27	*50	13	25	.50	1.36
F	Helianthella uniflora	20	15	8	6	.12	.08
F	Hymenoxys acaulis	56	*15	19	6	.24	.10
F	Hymenopappus filifolius	54	30	21	14	1.20	.32
F	Lesquerella spp.	135	*37	51	16	.45	.13
F	Machaeranthera canescens	14	*-	6	-	.03	-
F	Machaeranthera grindelioides	53	68	22	30	.28	.74
F	Penstemon spp.	-	13	-	7	-	.04
F	Penstemon spp.	8	-	5	-	.05	-
F	Penstemon palmeri	5	-	2	-	.01	-
F	Phlox hoodii	150	123	65	58	.80	1.13
F	Physaria spp.	2	*14	1	7	.00	.03
F	Townsendia incana	13	12	6	6	.05	.05
F	Unknown forb-perennial	37	*-	13	-	.16	-
Total for Annual Forbs		0	3	0	1	0	0.00
Total for Perennial Forbs		589	382	239	177	3.99	4.02
Total for Forbs		589	385	239	178	3.99	4.02

* Indicates significant difference at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 11B, Study no: 14

Type	Species	Strip Frequency '94	Strip Frequency '00	Average Cover % '94	Average Cover % '00
B	Cercocarpus montanus	8	7	.69	1.50
B	Chrysothamnus nauseosus	13	10	.28	.15
B	Chrysothamnus viscidiflorus	2	3	.00	-
B	Ephedra viridis	3	1	-	-
B	Eriogonum corymbosum	37	45	.85	1.22
B	Gutierrezia sarothrae	15	12	.10	.08
B	Juniperus osteosperma	0	1	-	.03
B	Pinus edulis	0	4	1.26	1.52
Total for Browse		78	83	3.21	4.50

CANOPY COVER --
Herd unit 11B, Study no: 14

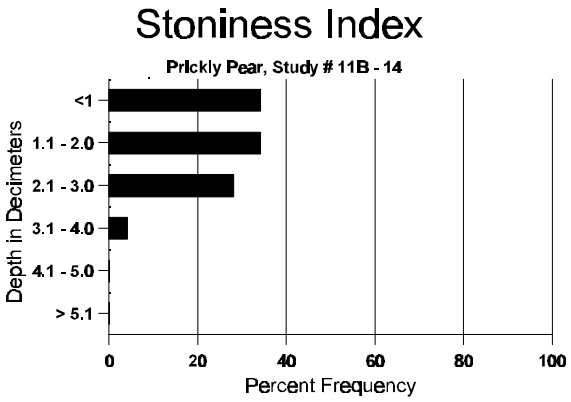
Species	Percent Cover '00
Pinus edulis	.80

BASIC COVER --
Herd unit 11B, Study no: 14

Cover Type	Nested Frequency '94	Nested Frequency '00	Average Cover % '94	Average Cover % '00
Vegetation	360	310	12.62	13.89
Rock	388	226	15.38	13.51
Pavement	432	399	6.16	16.37
Litter	456	357	19.67	23.13
Cryptogams	2	7	.00	.06
Bare Ground	443	420	34.38	42.35

SOIL ANALYSIS DATA --
Herd Unit 11B, Study # 14, Study Name: Prickly Pear

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
14.20	64.6 (16.30)	7.6	31.6	36.8	31.6	3.5	2.0	201.6	0.6



PELLET GROUP FREQUENCY --
Herd unit 11B, Study no: 14

Type	Quadrat Frequency		Pellet Transect	
	'94	'00	Pellet Groups per Acre '00	Days Use per Acre (ha) '00
Rabbit	10	8	531	N/A
Horse	-	2	96	N/A
Elk	21	7	287	23 (57)
Cow	-	-	113	10 (25)
Deer	8	1	-	-

BROWSE CHARACTERISTICS --
Herd unit 11B, Study no: 14

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Amelanchier utahensis																		
M	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	45	61	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'94	0	Dec:	-
	'00	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Cercocarpus montanus																		
S	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
M	94	3	4	2	-	-	-	-	-	-	9	-	-	-	180	29	36	9
	00	5	-	2	-	2	2	-	-	-	11	-	-	-	220	32	47	11
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	44%	22%	00%	+18%
'00	18%	36%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'94	180	Dec:		-
'00	220			-

Chrysothamnus nauseosus																		
Y	94	-	1	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	1	-	-	-	-	-	-	-	1	-	-	-	20			1
M	94	16	-	2	-	-	-	-	-	-	18	-	-	-	360	22	24	18
	00	12	-	-	-	-	-	-	-	-	12	-	-	-	240	20	23	12
D	94	2	-	3	-	-	-	-	-	-	1	-	-	4	100			5
	00	2	1	-	-	-	-	-	-	-	2	-	-	1	60			3
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	04%	21%	17%	-33%
'00	13%	00%	06%	

Total Plants/Acre (excluding Dead & Seedlings)				
'94	480	Dec:		21%
'00	320			19%

Chrysothamnus viscidiflorus																		
M	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40	5	8	2
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40	4	7	2
D	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	00%	00%	00%	+33%
'00	00%	00%	33%	

Total Plants/Acre (excluding Dead & Seedlings)				
'94	40	Dec:		0%
'00	60			33%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Ephedra viridis																		
Y	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	16	19	1
	00	-	-	1	-	-	-	-	-	-	1	-	-	-	20	16	10	1
D	94	-	1	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	33%	00%	00%	-67%
'00	00%	100%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'94	60	Dec:		33%
'00	20			0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Eriogonum corymbosum																		
S	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	00	9	-	-	-	-	-	-	-	-	9	-	-	-	180			9
Y	94	29	4	-	-	-	-	-	-	-	33	-	-	-	660			33
	00	28	1	-	-	-	-	-	-	-	29	-	-	-	580			29
M	94	52	7	-	-	1	-	-	-	-	60	-	-	-	1200	11	16	60
	00	56	3	-	-	-	-	2	-	-	60	-	1	-	1220	9	13	61
D	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	17	-	-	2	-	-	-	-	-	10	5	-	4	380			19
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	13%	00%	00%	+14%
'00	04%	00%	05%	

Total Plants/Acre (excluding Dead & Seedlings)				
'94	1880	Dec:		1%
'00	2180			17%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
Y	94	6	-	-	-	-	-	-	-	-	6	-	-	-	120			6
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	94	30	-	-	-	-	-	-	-	-	30	-	-	-	600	5	6	30
	00	24	-	-	-	-	-	-	-	-	24	-	-	-	480	4	6	24
D	94	2	-	-	-	-	-	-	-	-	1	-	-	1	40			2
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	00%	00%	03%	-37%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'94	760	Dec:		5%
'00	480			0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Juniperus osteosperma																		
S	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	1	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'94	00%	00%	00%
'00	00%	00%	00%

Total Plants/Acre (excluding Dead & Seedlings)					
	'94	0	Dec:	%Change	-
	'00	20			-

Pinus edulis																		
S	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'94	00%	00%	00%
'00	00%	00%	00%

Total Plants/Acre (excluding Dead & Seedlings)					
	'94	0	Dec:	%Change	-
	'00	80			-

Trend Study 11B-15-00

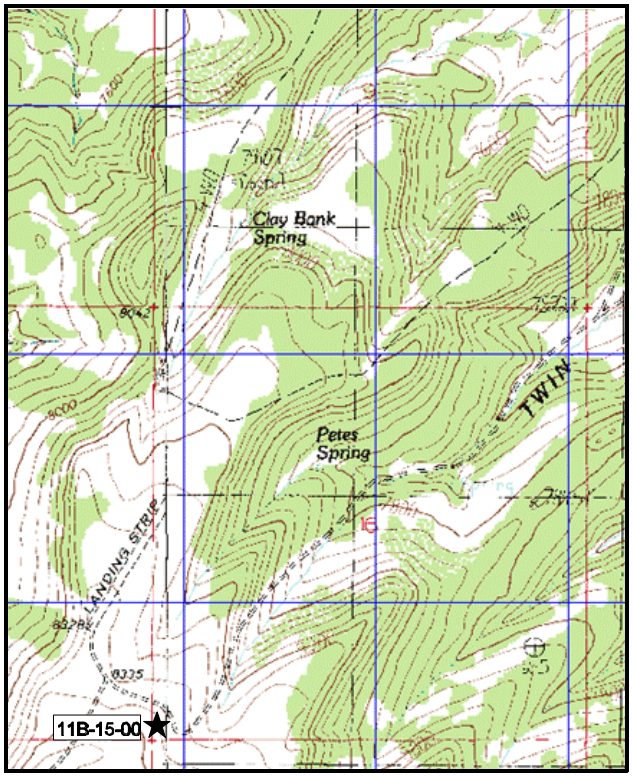
Study site name: Twin Hollow . Range type: Mixed Mountain Brush .

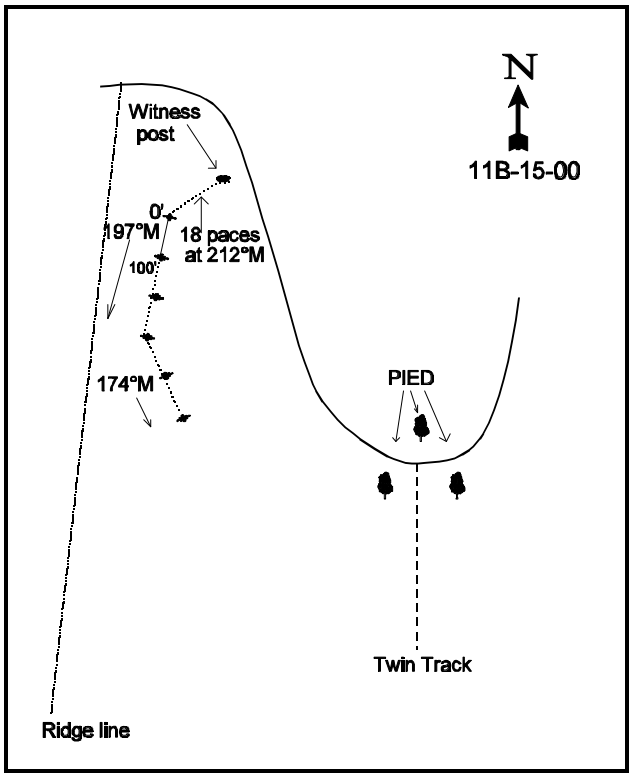
Compass bearing: frequency baseline 197°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft).

LOCATION DESCRIPTION

On the Nine Mile Canyon road, continue 3.35 miles past the turn to Prickly Pear Canyon. Turn right (south) and drive up Cottonwood Canyon. Continue 1.7 miles to a cattle guard. Drive an additional 5 miles to a gate. At the gate turn right and drive 4.95 miles to a fork. Continue straight 1.5 miles to a Y intersection (left is twin track) On the south side of the intersection is a large lone pinyon pine tree. Continue on the main road another 0.1 mile to a witness post on the left side of the road. The 0 foot stake is 18 paces away at a bearing of 212°M.





Map Name: Bruin Point

Diagrammatic Sketch

Township 13S , Range 15E , Section 15

UTM. 4393183.655 N, 564281.231 E

DISCUSSION

Trend Study No. 11B-15 (32-21)

The Twin Hollow site was established in 1994 to monitor critical winter range for elk and a transitional range for deer in most winters. It samples a mountain brush type at an elevation of 7,900 feet, just off a small ridge with a slight southeast aspect. Slope is 23% to 25%. Pellet group transect data taken during the 2000 reading estimate 68 elk and only 5 deer days use/acre (168 edu/ha and 12 ddu/ha). Most of the elk pellet groups were concentrated on a ridge to the west of the study site baseline. The area is also utilized by a small band of wild horses with pellet group data estimating 12 horse days use/acre (30 hdu/ha) in 2000.

Soil on the site is moderately deep (the deepest of all 11B sites), but quite variable as evidenced by the presence of both black sagebrush and mountain big sagebrush. Average effective rooting depth is estimated at just over 17 inches. It is deeper along the first 200 feet of the baseline then becomes more shallow and rocky. Serviceberry and mountain mahogany dominate on the deeper soil, while black and mountain big sagebrush are much more numerous on the more shallow soil. The few mahogany and serviceberry found on the more shallow soil are stunted. Parent material is sandstone. Soil texture is a loam with neutral soil reaction (pH of 7.0). Phosphorus is limited at only 3.5 ppm, as values less than 10 ppm may have been shown to limit normal plant growth and development. There is little rock on the surface except for some gravel and large flat rocks predominately at the end of the baseline. There is little sign of erosion with a very high cover value for vegetation with excellent litter cover. Another positive characteristic of the vegetative cover is that over 40% of the cover is made up of herbaceous plants which protect the soils much better from high intensity summer storms.

The browse composition is good with 9 species sampled in 1994 and 2000. Serviceberry, mountain big sagebrush, and true mountain mahogany, provide 73% of the browse cover. All three species show light to moderate use, stable densities, low decadence, and generally good vigor. Poor vigor on serviceberry in 2000 was the result of very dry conditions which caused leaves to yellow and drop off prematurely. Leader growth in 2000 averaged about 10 inches for serviceberry, 13 inches for mahogany and 4 inches for mountain big sagebrush.

Black sagebrush is found in areas with more shallow soil and it appears that it is hybridizing with the mountain big sagebrush. Other common understory shrubs include: dwarf and stickyleaf low rabbitbrush, snowberry, and broom snakeweed. There are also a few bitterbrush on the site which are only lightly browsed.

The herbaceous understory composition is excellent with 44 species encountered in 1994 and 37 in 2000. Nine species of grasses were found, but only two, bluebunch wheatgrass, and Salina wildrye are abundant. These two grasses currently (‘00) provide 83% of the grass cover. Forbs are diverse and provide nearly as much cover as grasses. Total forb cover was higher in 1994, but due to the extremely dry conditions in 2000, forb cover declined from 11% to 8%. Common forbs include bastard toad flax, sulfur eriogonum, and desert phlox which currently (‘00) provide 76% of the forb cover in 2000. No use was apparent on any of the grasses or forbs during the 2000 reading.

1994 APPARENT TREND ASSESSMENT

Even with the moderately high percent of bare ground (21%), with the high amounts of both litter cover and vegetative cover, trend for this site appears stable. Trend for the browse species also appears stable with high cover values, good diversity, excellent health, and vigor for all key species. The herbaceous understory is diverse, abundant, and in good condition.

2000 TREND ASSESSMENT

Trend for soil is slightly improved. Nested frequency of vegetation and litter declined slightly but cover of both increased. In addition, herbaceous cover increased slightly compared to 1994. Trend for the key browse species, serviceberry, mountain big sagebrush, and true mountain mahogany, is stable. Use on these shrubs is light to moderate, vigor is good, and decadence low. The populations have remained at similar densities compared to 1994. Trend for the herbaceous understory is down slightly. Even though cover of grasses increased since 1994 (9% to 13%), sum of nested frequency declined. However, the dominant grasses, bluebunch wheatgrass and Salina wildrye, did not change significantly in frequency. Due to the extremely dry conditions, cover and nested frequency of forbs declined. This trend should reverse itself with a return to normal precipitation patterns.

TREND ASSESSMENT
soil - up slightly (4)
browse - stable (3)
herbaceous understory - down slightly (2)

HERBACEOUS TRENDS --
Herd unit 11B, Study no: 15

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'94	'00	'94	'00	'94	'00
G	Agropyron spicatum	159	178	56	61	1.77	6.01
G	Carex spp.	9	5	4	2	.02	.15
G	Elymus cinereus	-	5	-	1	-	.15
G	Elymus salina	142	123	48	43	4.34	4.78
G	Koeleria cristata	24	*2	12	2	.19	.06
G	Oryzopsis hymenoides	7	-	4	-	.07	-
G	Poa fendleriana	62	58	24	21	1.33	.77
G	Sitanion hystrix	26	*3	9	3	.26	.04
G	Stipa columbiana	23	15	8	7	.57	.40
G	Stipa lettermani	57	*16	18	6	.74	.65
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		509	405	183	146	9.32	13.03
Total for Grasses		509	405	183	146	9.32	13.03
F	Androsace septentrionalis (a)	4	5	2	1	.01	.00
F	Arabis spp.	3	1	1	1	.00	.00
F	Arenaria fendleri	9	5	3	4	.06	.04
F	Astragalus convallarius	18	*1	9	1	.07	.00
F	Astragalus miser	1	-	1	-	.00	-
F	Aster spp.	24	*8	11	3	.18	.04
F	Astragalus spp.	11	2	6	1	.03	.03

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'94	'00	'94	'00	'94	'00
F	Balsamorhiza sagittata	-	-	-	-	-	.03
F	Castilleja flava	36	*11	16	6	.15	.05
F	Chenopodium album (a)	2	-	1	-	.00	-
F	Chaenactis douglasii	15	*-	7	-	.04	-
F	Chenopodium spp. (a)	5	-	2	-	.01	-
F	Chenopodium fremontii (a)	7	-	3	-	.04	-
F	Comandra pallida	150	*201	53	75	2.10	3.40
F	Collinsia parviflora (a)	65	*10	26	6	.38	.08
F	Crepis acuminata	-	3	-	1	-	.03
F	Cryptantha spp.	-	1	-	1	-	.00
F	Erigeron eatonii	110	*18	43	8	.44	.11
F	Erigeron flagellaris	16	14	10	7	.18	.08
F	Erigeron spp.	-	5	-	3	-	.01
F	Eriogonum racemosum	54	*9	16	4	1.12	.07
F	Eriogonum umbellatum	150	115	50	53	2.83	1.30
F	Hymenoxys acaulis	-	1	-	1	-	.03
F	Hymenoxys richardsonii	5	-	3	-	.06	-
F	Ipomopsis aggregata	15	2	5	2	.07	.01
F	Linum lewisii	30	*-	12	-	.06	-
F	Lithospermum spp.	16	*8	9	3	.32	.18
F	Machaeranthera canescens	12	*-	7	-	.08	-
F	Machaeranthera grindelioides	30	2	11	1	.18	.03
F	Microsteris gracilis (a)	-	-	-	-	-	-
F	Oenothera spp.	33	*-	14	-	.36	-
F	Penstemon caespitosus	90	*-	31	-	.91	-
F	Penstemon spp.	3	*38	2	11	.01	.15
F	Penstemon watsonii	29	22	10	12	.25	.70
F	Phlox austromontana	50	58	18	22	1.11	1.65
F	Phlox longifolia	58	*27	23	12	.11	.21
F	Polygonum douglasii (a)	41	-	14	-	.07	-
F	Taraxacum officinale	4	8	2	4	.03	.04
Total for Annual Forbs		124	15	48	7	0.51	0.08
Total for Perennial Forbs		972	560	373	236	10.82	8.26
Total for Forbs		1096	575	421	243	11.33	8.35

* Indicates significant difference at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 11B, Study no: 15

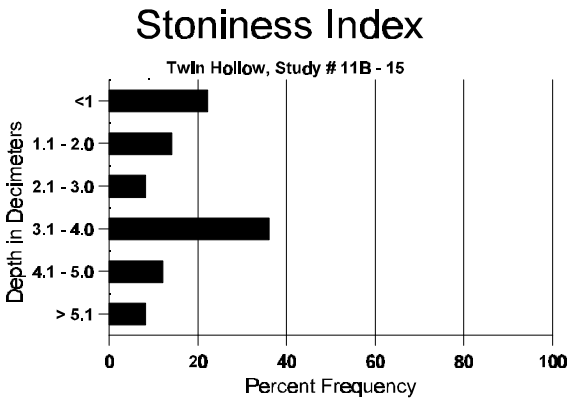
Type	Species	Strip Frequency '94	Strip Frequency '00	Average Cover % '94	Average Cover % '00
B	Amelanchier utahensis	25	35	4.98	7.68
B	Artemisia frigida	1	0	-	-
B	Artemisia nova	23	24	1.37	.73
B	Artemisia tridentata vaseyana	71	68	6.51	10.85
B	Cercocarpus montanus	41	41	6.06	6.55
B	Chrysothamnus depressus	16	20	.80	.19
B	Chrysothamnus viscidiflorus	84	47	1.26	.67
B	Gutierrezia sarothrae	27	14	.48	.12
B	Opuntia spp	2	1	-	-
B	Purshia tridentata	2	2	-	.38
B	Symphoricarpos oreophilus	52	45	2.41	2.78
B	Tetradymia canescens	2	0	.03	-
Total for Browse		346	297	23.93	30.00

BASIC COVER --
Herd unit 11B, Study no: 15

Cover Type	Nested Frequency '94	Nested Frequency '00	Average Cover % '94	Average Cover % '00
Vegetation	427	392	42.89	48.85
Rock	174	66	2.13	1.44
Pavement	178	152	.41	2.82
Litter	486	476	44.90	62.65
Cryptogams	2	-	.00	0
Bare Ground	332	238	21.18	17.28

SOIL ANALYSIS DATA --
Herd Unit 11B, Study # 15, Study Name: Twin Hollow

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
17.13	61.8 (17.01)	7.0	44.0	31.4	24.6	4.6	3.5	291.2	0.7



PELLET GROUP FREQUENCY --
Herd unit 11B, Study no: 15

Type	Quadrat Frequency '94	Quadrat Frequency '00	Pellet Transect: Pellet Groups per Acre '00	Pellet Transect: Days Use per Acre (ha) '00
Rabbit	5	1	191	N/A
Horse	4	4	139	N/A
Elk	11	13	887	69 (169)
Deer	5	5	61	5 (12)

BROWSE CHARACTERISTICS --
Herd unit 11B, Study no: 15

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Amelanchier utahensis																		
S	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
Y	94	1	1	-	1	-	-	-	-	-	3	-	-	-	60			3
	00	7	2	-	1	-	-	-	-	-	9	-	1	-	200			10
M	94	51	4	-	-	-	-	-	-	-	55	-	-	-	1100	42	49	55
	00	15	3	-	8	14	-	7	-	-	20	-	26	1	940	44	51	47
D	94	-	1	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	1	-	-	-	-	-	-	-	1	20			1
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	10%	00%	00%	- 2%
'00	34%	00%	50%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'94	1180	Dec:	2%
	'00	1160		2%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia frigida																		
M	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		'94		Moderate Use 00%		Heavy Use 00%			Poor Vigor 00%						%Change			
		'00		00%		00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'94				20	Dec:		-
											'00				0			-
Artemisia nova																		
S	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	94	5	2	-	2	-	-	-	-	-	9	-	-	-	180			9
	00	3	1	-	-	-	-	-	-	-	4	-	-	-	80			4
M	94	26	4	-	1	-	-	-	-	-	31	-	-	-	620	11	13	31
	00	49	-	-	6	-	-	-	-	-	55	-	-	-	1100	10	14	55
D	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	80			4
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
% Plants Showing		'94		Moderate Use 15%		Heavy Use 00%			Poor Vigor 00%						%Change +31%			
		'00		02%		00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'94				820	Dec:		2%
											'00				1180			0%
Artemisia tridentata vaseyana																		
S	94	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
	00	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
Y	94	32	1	-	3	-	-	-	-	-	36	-	-	-	720			36
	00	31	-	-	-	-	-	-	-	-	31	-	-	-	620			31
M	94	305	7	1	1	-	-	3	-	-	317	-	-	-	6340	16	17	317
	00	229	27	-	1	-	-	-	-	-	257	-	-	-	5140	16	22	257
D	94	3	3	2	3	1	-	-	-	-	7	-	-	5	240			12
	00	23	7	-	-	-	-	1	-	-	26	-	1	4	620			31
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	180			9
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	220			11
% Plants Showing		'94		Moderate Use 03%		Heavy Use .82%			Poor Vigor 01%						%Change -13%			
		'00		11%		00%			02%									
Total Plants/Acre (excluding Dead & Seedlings)											'94				7300	Dec:		3%
											'00				6380			10%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Cercocarpus montanus																		
S	94	17	-	-	-	-	-	-	-	-	17	-	-	-	340			17
	00	148	-	-	30	-	-	-	-	-	178	-	-	-	3560			178
Y	94	52	8	-	4	-	-	-	-	-	64	-	-	-	1280			64
	00	46	19	-	7	-	-	-	-	-	72	-	-	-	1440			72
M	94	27	22	-	1	-	-	-	-	-	50	-	-	-	1000	44	48	50
	00	24	8	1	2	12	2	2	-	-	50	-	1	-	1020	46	47	51
D	94	12	1	-	-	-	-	-	-	-	3	-	-	10	260			13
	00	1	-	-	1	1	-	-	-	-	2	-	-	1	60			3
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	24%	00%	08%	- 1%
'00	32%	02%	02%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'94	2540	Dec:	10%
	'00	2520		2%

Chrysothamnus depressus																		
Y	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	94	82	-	-	-	-	-	-	-	-	82	-	-	-	1640	5	6	82
	00	61	1	-	1	-	-	-	-	-	63	-	-	-	1260	3	5	63
D	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	2	-	-	-	-	-	-	-	-	-	-	-	2	40			2
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	00%	00%	00%	-24%
'00	02%	00%	03%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'94	1700	Dec:	0%
	'00	1300		3%

Chrysothamnus viscidiflorus																		
Y	94	16	-	-	-	-	-	-	-	-	16	-	-	-	320			16
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	94	235	-	-	22	-	-	4	-	-	261	-	-	-	5220	8	7	261
	00	63	-	-	5	-	-	7	-	-	75	-	-	-	1500	11	10	75
D	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	4	-	-	-	-	-	-	-	-	-	-	-	4	80			4

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	00%	00%	00%	-72%
'00	00%	00%	05%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'94	5560	Dec:	0%
	'00	1580		5%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
Y	94	7	-	-	1	-	-	-	-	-	8	-	-	-	160			8
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	94	59	-	-	-	-	-	-	-	-	59	-	-	-	1180	6	5	59
	00	39	-	-	-	-	-	-	-	-	39	-	-	-	780	4	4	39

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	00%	00%	00%	-42%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'94	1340	Dec:		-
'00	780			-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia spp.																		
Y	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	2	11	1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	00%	00%	00%	-50%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'94	40	Dec:		0%
'00	20			100%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Purshia tridentata																		
Y	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40	18	40	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	00%	00%	00%	+ 0%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'94	40	Dec:		-
'00	40			-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Symphoricarpos oreophilus																		
Y	94	7	-	-	1	-	-	-	-	-	8	-	-	-	160			8
	00	12	-	-	-	-	-	-	-	-	11	-	1	-	240			12
M	94	53	3	-	52	-	-	4	-	-	109	-	-	3	2240	12	19	112
	00	43	-	-	10	-	-	9	-	-	61	-	1	-	1240	10	18	62
D	94	-	1	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	4	-	-	-	-	-	-	-	-	-	-	-	4	80			4

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	03%	00%	02%	-36%
'00	00%	00%	08%	

Total Plants/Acre (excluding Dead & Seedlings)				
'94	2420	Dec:		1%
'00	1560			5%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Tetradymia canescens																		
M	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40	7	7	2
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6	10	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'94	00%	00%	00%
'00	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'94	40	Dec:	-
	'00	0		-

Trend Study 11B-16-00

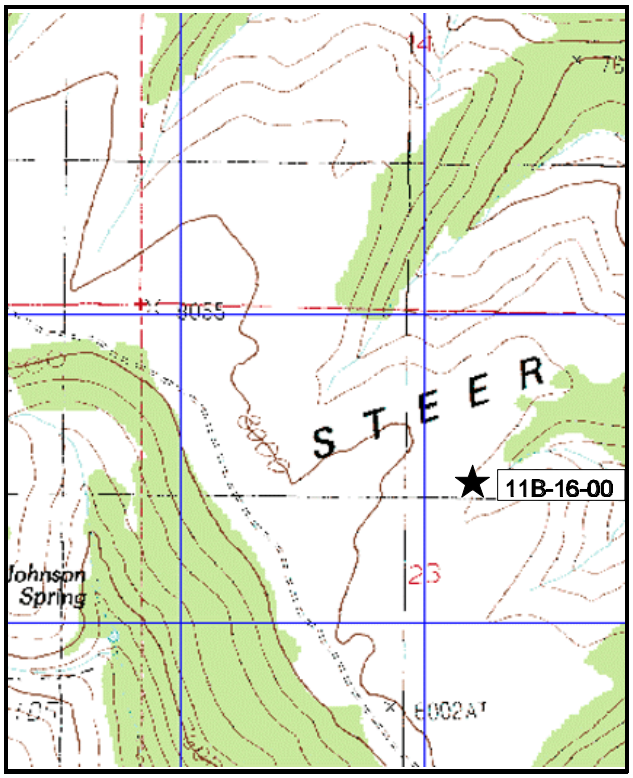
Study site name: Steer Ridge . Range type: Mixed Mountain Brush .

Compass bearing: frequency baseline 234°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft).

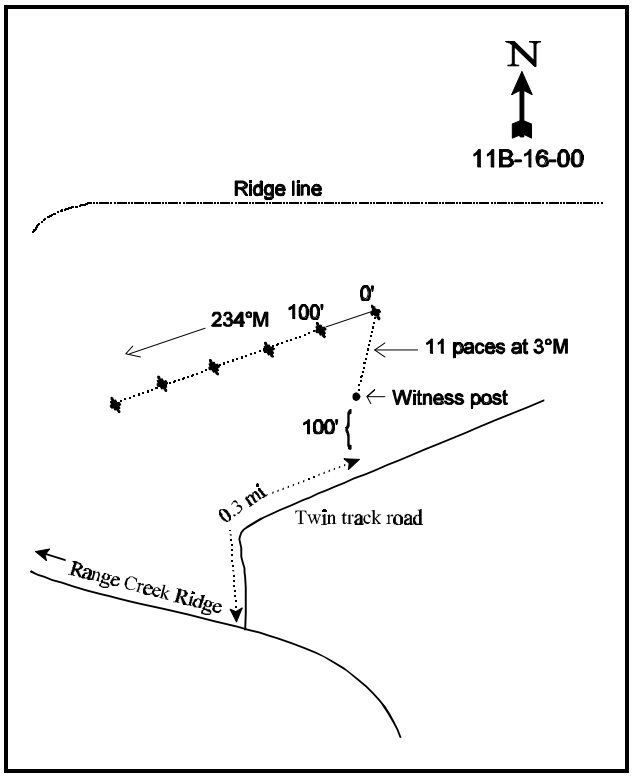
LOCATION DESCRIPTION

From Sunnyside, go up Water Canyon to the summit (Bruin Point). At the summit take the middle fork and go 0.35 miles. Stay right at the fork just beyond a cattle guard and go 0.9 miles. Go through an intersection beyond another cattle guard and go 3.1 miles to a fork. Stay right and travel another 2.9 miles to a fork and turn left just before a gate. Proceed 0.1 miles to a gate. Continue 4.2 miles to a fork. Stay left and continue an additional 1.3 miles to another gate. Continue 5.1 miles and turn left on a twin track road. Drive north 0.3 miles to a witness post 100 ft off the left side of the road. The 0 ft stake is 11 paces away at 3°M and is marked with browse tag number 32 DWR. The baseline runs at an azimuth of 234°M.



Map Name: Steer Ridge Canyon

Township 14S , Range 16E , Section 23



Diagrammatic Sketch

UTM. 4383080.755 N, 578010.174 E

DISCUSSION

Trend Study No. 11B-16 (32-22)

The Steer Ridge trend study was established in 1994. It samples a mountain shrub community near the end of Steer Ridge, only a few miles from the Green River. Elevation of the site is 7,800 feet which slopes slightly to the south. The mountain brush community type here is noticeably shorter in stature than that of the Twin Hollow study. The area is used heavily by wintering elk and deer. Deer are forced to move to lower elevations when snows get deeper, but elk are often seen in the area all winter. Pellet group data from 2000 estimate 82 elk and 19 deer use days/acre (203 edu/ha and 47 ddu/ha). There was also some light use by horses and cattle in 1994, although there has been no livestock use since.

The soils on this site are moderately shallow and rocky with bed rock found at a depth of only 10 to 12 inches. Average effective rooting depth is estimated at just 10 inches. There appears to be enough cracks in the rock to allow deeper rooted shrubs like serviceberry, bitterbrush, and mountain big sagebrush to becoming establish. The deepest soil readings occurred near the base of shrubs. Parent material is sandstone and soil texture is a sandy clay loam with a neutral soil reaction (pH of 7.2). Phosphorus is limited at 5.5 ppm, as values less than 10 ppm have been shown to limit normal plant growth and development. The soil profile is rocky throughout with surface rock having a cover of 9% in 1994 and 15% in 2000. Vegetative and litter cover are moderately low for a high elevation site. This suggests a lower site potential due to the more shallow soil than would normally be expected for a site at this elevation.

Key browse on this site consist of mountain big sagebrush and bitterbrush which provided 84% of the total shrub cover in 1994 and 85% in 2000. The bitterbrush have mostly good vigor with a density of 1,120 plants/acre and only 9% classified as decadent in 2000. They are a shorter growth form averaging just over 2 feet in height with a crown diameter of 4.5 feet. Use is mostly light to moderate. Mountain big sagebrush has a moderate density of 2,160 plants/acre (‘00). It shows a higher percent decadency which has increased from 13% in 1994 to 22% in 2000. Use is mostly light to moderate. It appears that the abundant perennial grass component combined with drought may be negatively affecting the sagebrush. This is more pronounced in the shallow draw bottoms where perennial grasses are more abundant and where most of the sagebrush appear to be decadent and dying with little apparent reproduction. The more shallow soil and reduced site potential makes this area a more marginal site for mountain big sagebrush. Very high abundance of ants, associated with the presence of aphids, also appears to be effecting the vigor of some sagebrush plants. However, reproduction is adequate to maintain the stand.

Serviceberry provides an additional 8% of the total browse cover with a small population of 160 plants/acre (‘00). These shrubs are more heavily utilized than sagebrush or bitterbrush. Individual serviceberry are smaller in stature due to the shallow, rocky soil. Average height is only 31 inches making many plants all available to hedging. Other common shrubs include dwarf and mountain low rabbitbrush. There are also a few scattered rubber rabbitbrush, mountain mahogany, snowberry, and gray horsebrush.

The herbaceous understory is abundant and diverse with about 60% of the total vegetative cover coming from the herbaceous species. What makes this site better than most is that there are several co-dominant grass species including; thickspike, bluebunch wheatgrass, mutton bluegrass, and needle-and-thread. This abundance of key grass species would be advantageous for elk winter use. Forbs are diverse but they do not provide very much forage. The 25 species sampled in 1994 and 27 species in 2000 provide only about 3.5% cover.

1994 APPARENT TREND ASSESSMENT

Soil trend for the site appears stable with good herbaceous vegetative cover (60% of the vegetative cover) which provides the best protection from high intensity summer storms. The trend for key browse would also appear

stable with good age distributions, excellent vigor, and low rates of decadency which are not bad for the length and severity of the current drought. The herbaceous understory is also very good, with excellent production from more than five species of grasses. The forb component has many species (25), but only contributes 11% of the total vegetative cover.

2000 TREND ASSESSMENT

Trend for soil is improving with increases in vegetative and litter cover combined with a decline in cover of bare ground. Herbaceous vegetation, which better protects the soil from high intensity storms, accounts for nearly 60% of the total vegetative cover. Trend for browse is stable with stable populations of mountain big sagebrush and bitterbrush. Use of these shrubs is light to moderate, vigor is good, and percent decadence is low. Trend for the herbaceous understory is stable. Sum of nested frequency of perennial grasses declined slightly but cover increased from 14% to almost 18%. Nested frequency of mutton bluegrass increased significantly while the less desirable Salina wildrye declined significantly. Prairie junegrass, a warm season species, was abundant in 1994, but decreased significantly in 2000 as well. It appears that the extremely dry conditions this summer have contributed to this decline. Sum of nested frequency of perennial forbs also declined slightly with only two species, sego lily and desert parsley, declined significantly. Total cover of forbs is almost identical to 1994.

TREND ASSESSMENT
soil - up slightly (4)
browse - stable (3)
herbaceous understory - stable (3)

HERBACEOUS TRENDS --
Herd unit 11B, Study no: 16

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'94	'00	'94	'00	'94	'00
G	Agropyron dasystachyum	146	160	43	55	1.61	3.76
G	Agropyron spicatum	151	147	52	45	4.19	4.91
G	Bouteloua gracilis	-	4	-	2	-	.18
G	Bromus tectorum (a)	-	1	-	1	-	.00
G	Elymus salina	69	*25	20	10	2.32	.63
G	Koeleria cristata	86	*5	29	2	1.81	.03
G	Oryzopsis hymenoides	32	*9	11	3	.28	.19
G	Poa fendleriana	72	*187	29	62	1.15	4.67
G	Poa secunda	27	39	10	14	.17	.24
G	Sitanion hystrix	1	1	1	1	.00	.03
G	Stipa comata	67	78	22	31	1.95	3.06
G	Stipa lettermani	27	*-	11	-	.72	.00
Total for Annual Grasses		0	1	0	1	0	0.00
Total for Perennial Grasses		678	655	228	225	14.25	17.73
Total for Grasses		678	656	228	226	14.25	17.73
F	Agoseris glauca	12	6	7	5	.06	.05
F	Antennaria spp.	14	8	6	2	.13	.15
F	Arabis spp.	3	-	1	-	.00	-
F	Arenaria fendleri	10	-	3	-	.18	-
F	Astragalus convallarius	-	3	-	1	-	.00
F	Aster spp.	-	5	-	2	-	.01
F	Astragalus spp.	3	7	1	3	.01	.34
F	Balsamorhiza sagittata	7	3	4	3	.86	.33
F	Calochortus flexuosus	17	*-	6	-	.05	-
F	Castilleja linariaefolia	23	22	9	10	.14	.12
F	Chenopodium fremontii (a)	1	-	1	-	.00	-
F	Chenopodium leptophyllum (a)	5	-	2	-	.01	-
F	Comandra pallida	4	*18	2	10	.03	.32
F	Collinsia parviflora (a)	-	4	-	2	-	.01
F	Crepis acuminata	10	9	5	4	.07	.19
F	Eriogonum alatum	13	9	6	3	.08	.09
F	Erigeron eatonii	18	14	7	7	.16	.27
F	Erigeron spp.	-	1	-	1	-	.00
F	Eriogonum umbellatum	23	14	9	6	.29	.08
F	Gayophytum ramosissimum (a)	2	4	1	2	.00	.01
F	Linum lewisii	-	*7	-	4	-	.02

Type	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'94	'00	'94	'00	'94	'00
F	Lithospermum ruderale	12	5	5	2	.19	.18
F	Lomatium spp.	33	*1	11	1	.08	.00
F	Oenothera spp.	-	3	-	1	-	.00
F	Penstemon caespitosus	10	2	5	2	.24	.04
F	Penstemon spp.	2	2	2	2	.01	.01
F	Phlox longifolia	58	53	22	25	.11	.32
F	Polygonum douglasii (a)	45	*16	21	7	.10	.03
F	Sphaeralcea coccinea	78	62	32	26	.77	.67
F	Taraxacum officinale	-	3	-	1	-	.03
F	Tragopogon dubius	-	-	-	-	.00	-
F	Trifolium spp.	-	6	-	2	-	.01
Total for Annual Forbs		53	24	25	11	0.12	0.05
Total for Perennial Forbs		350	263	143	123	3.50	3.29
Total for Forbs		403	287	168	134	3.63	3.34

* Indicates significant difference at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 11B, Study no: 16

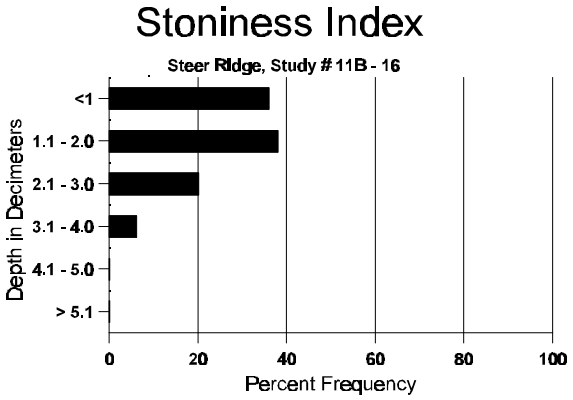
Type	Species	Strip Frequency		Average Cover %	
		'94	'00	'94	'00
B	Amelanchier utahensis	4	5	.03	1.19
B	Artemisia tridentata vaseyana	78	62	3.79	6.40
B	Cercocarpus montanus	0	0	-	-
B	Chrysothamnus depressus	52	33	1.45	.74
B	Chrysothamnus viscidiflorus lanceolatus	16	15	.29	.18
B	Gutierrezia sarothrae	3	1	.00	-
B	Opuntia spp.	1	0	.00	-
B	Purshia tridentata	43	41	6.48	6.65
B	Symphoricarpos oreophilus	2	2	.03	.00
B	Tetradymia canescens	7	4	.03	.18
Total for Browse		206	163	12.13	15.35

BASIC COVER --
Herd unit 11B, Study no: 16

Cover Type	Nested Frequency		Average Cover %	
	'94	'00	'94	'00
Vegetation	526	410	38.01	41.91
Rock	304	177	6.60	6.08
Pavement	264	302	2.01	9.07
Litter	369	475	20.10	46.68
Cryptogams	12	19	.06	.30
Bare Ground	361	341	20.32	18.44

SOIL ANALYSIS DATA --
Herd Unit 11B, Study # 16, Study Name: Steer Ridge

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
10.82	66.8 (12.68)	7.2	52.0	25.4	22.6	3.3	5.5	176.0	0.7



PELLET GROUP FREQUENCY --
Herd unit 11B, Study no: 16

Type	Quadrat Frequency	
	'94	'00
Rabbit	7	7
Horse	1	-
Elk	44	53
Deer	37	21
Cattle	2	-

Pellet Transect	
Pellet Groups per Acre	Days Use per Acre (ha)
'00	'00
-	-
-	-
1061	82 (202)
252	20 (48)
-	-

BROWSE CHARACTERISTICS --
Herd unit 11B, Study no: 16

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Amelanchier utahensis																		
Y	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	00	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
M	94	2	1	-	-	-	-	-	-	-	3	-	-	-	60	30	42	3
	00	3	1	-	-	3	-	-	-	-	5	-	2	-	140	31	46	7

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	20%	00%	00%	+38%
'00	50%	00%	25%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'94	100	Dec:	-
	'00	160		-

Artemisia tridentata vaseyana																		
S	94	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
Y	94	26	-	-	-	-	-	-	-	-	26	-	-	-	520			26
	00	14	2	-	1	-	-	-	-	-	15	1	1	-	340			17
M	94	75	11	4	3	-	-	-	-	-	93	-	-	-	1860	19	26	93
	00	37	19	2	8	1	-	-	-	-	62	5	-	-	1340	17	26	67
D	94	3	14	-	-	-	1	-	-	-	15	-	-	3	360			18
	00	17	6	-	1	-	-	-	-	-	11	5	-	8	480			24
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	460			23
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	200			10

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	18%	04%	02%	-21%
'00	26%	02%	08%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'94	2740	Dec:	13%
	'00	2160		22%

Cercocarpus montanus																		
M	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	38	38	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	37	44	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'94	0	Dec:	-
	'00	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus depressus																		
Y	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
M	94	151	14	-	2	-	-	2	-	-	169	-	-	-	3380	6	9	169
	00	72	1	-	-	-	-	-	-	-	73	-	-	-	1460	4	7	73
D	94	3	-	-	-	-	-	-	-	-	-	-	-	3	60			3
	00	11	-	-	-	-	-	-	-	-	7	-	-	4	220			11
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	140			7

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	08%	00%	02%	-48%
'00	01%	00%	04%	

Total Plants/Acre (excluding Dead & Seedlings)				
'94	3440	Dec:		2%
'00	1780			12%

Chrysothamnus nauseosus hololeucus																		
M	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	11	24	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'94	0	Dec:	-
'00	0		-

Chrysothamnus viscidiflorus lanceolatus																		
Y	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	94	23	1	-	-	-	-	-	-	-	24	-	-	-	480	10	12	24
	00	18	-	-	4	-	-	-	-	-	22	-	-	-	440	10	10	22
D	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	04%	00%	00%	- 8%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'94	500	Dec:	0%
'00	460		4%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
M	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60	6	8	3
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	4	7	0
D	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	00%	00%	00%	-67%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)					
'94	60	Dec:	0%		
'00	20		100%		

Opuntia spp.																		
M	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	3	23	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	00%	00%	00%	
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'94	20	Dec:	-
'00	0		-

Purshia tridentata																		
Y	94	7	-	-	-	-	-	-	-	-	7	-	-	-	140			7
	00	3	-	-	-	-	-	-	-	-	2	-	1	-	60			3
M	94	37	9	-	1	9	-	-	-	-	56	-	-	-	1120	20	51	56
	00	25	12	-	-	10	1	-	-	-	46	2	-	-	960	26	56	48
D	94	1	-	2	-	4	-	-	-	-	7	-	-	-	140			7
	00	2	1	-	1	1	-	-	-	-	3	-	1	1	100			5
X	94	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	31%	03%	00%	-20%
'00	43%	02%	05%	

Total Plants/Acre (excluding Dead & Seedlings)			
'94	1400	Dec:	10%
'00	1120		9%

Symphoricarpos oreophilus																		
M	94	3	-	-	-	-	-	-	-	-	3	-	-	-	60	20	41	3
	00	2	-	-	-	-	-	-	-	-	2	-	-	-	40	15	29	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	00%	00%	00%	-33%
'00	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'94	60	Dec:	-
'00	40		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Tetradymia canescens																		
Y	94	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	94	6	1	-	-	-	-	-	-	-	7	-	-	-	140	8	12	7
	00	3	-	-	-	-	-	-	-	-	3	-	-	-	60	8	13	3
D	94	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	1	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'94	13%	00%	00%	-50%
'00	25%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'94	160	Dec:	0%
	'00	80		25%

SUMMARY

WILDLIFE MANAGEMENT UNIT 11B (32) - RANGE CREEK

Of the 15 trend study sites read in 1994, thirteen were re-read in 2000. All but one site, Upper Cottonwood (11B-6), samples deer and/or elk winter ranges. Lower elevation winter ranges north and east of Price were sampled with trend studies, Deadman (11B-1), Airport Bench (11B-2), Airport (11B-3), Coal Creek (11B-4) and 'B' Canyon (11B-5). All of these sites except Airport and B Canyon, had a stable or slightly improved soil trend. Browse trends were slightly down at Deadman and down at Airport Bench. Both sites sample old pinyon-juniper chainings. These sites support very limited preferred browse and increasing pinyon and juniper trees. B-Canyon, another old chaining, had a downward browse trend due to a wildfire which burned the area in 1996. Browse trends at Airport and Coal Creek are up. Herbaceous understories showed stable to improved trends on all sites except Deadman and Coal Creek. These 2 studies have little herbaceous production. Wildlife use on most of these low elevation winter ranges appears to be down compared to earlier readings. This may be due to the mild winters of the past few years.

Higher elevation winter ranges on the Range Creek Mountains include: Cottonwood (11B-7), Cedar Corral (11B-8), Cedar Ridge (11B-9), Prickly Pear (11B-14), Twin Hollow (11B-15) and Steer Ridge (11B-16). All of these sites have a stable or slightly upward soil trends but conditions are judged poor at Prickly Pear. Browse trends are slightly down at Cottonwood and up slightly at Cedar Ridge. All other sites displayed a stable browse trend. Herbaceous trends are slightly down at Cedar Corral, Prickly Pear and Twin Hollow, stable at Cedar Ridge and Steer Ridge, and improving at Cottonwood.

Winter range trend studies on the south end of the unit include: Upper Little Park Wash (11B-10), Little Park Exclosure (11B-11) and Williams Draw (11B-12). Due to a declining trend of deer use on these areas, only one site, Little Park Exclosure, was reread in 2000. Soil conditions and the herbaceous trend were slightly improved since 1994 but the browse trend was slightly down.

One summer range trend study, Upper Cottonwood (11B-6), was read on the unit. It samples a meadow surrounded by aspen, Douglas fir, and sub-alpine fir trees. Soil, browse, and herbaceous trends are stable.

Soils on Unit 11B have an average soil temperature of 58°F which is relatively cool compared to many winter range sites in the other units. This lower average soil temperature may also be the reason why cheatgrass is not dominant on any of these study sites. Many winter range sites throughout the state with higher soil temperatures ($70° F) are dominated by cheatgrass and other annuals. All sites except for Airport (11B-3) and Upper Cottonwood (11B-6) had low levels of soil phosphorus, less than 10 ppm, which has been shown to limit normal plant growth and development. Potassium levels were high on all sites.

Browse trends were down or slightly down on 5 of the 13 sites sampled in 2000 (39%). Herbaceous trends were down on only 3 of the 13 sites (23%). However, due do the extremely dry conditions sum of nested frequency of perennial forbs declined on 10 of the 13 sites (77%).

TREND SUMMARY

Site No. and Name	Category	1994	2000
11B-1 Deadman	soil	1	3
	browse	4	2
	herbaceous understory	2	3
11B-2 Airport Bench	soil	1	4
	browse	2	1
	herbaceous understory	1	4
11B-3 Airport	soil	2	2
	browse	5	5
	herbaceous understory	3	3
11B-4 Coal Creek	soil	3	3
	browse	5	5
	herbaceous understory	4	4
11B-5 B Canyon	soil	3	2
	browse	4	1
	herbaceous understory	3	5
11B-6 Upper Cottonwood	soil	4	3
	browse	2	3
	herbaceous understory	4	3
11B-7 Cottonwood	soil	4	4
	browse	3	2
	herbaceous understory	4	4
11B-8 Cedar Corral	soil	3	4
	browse	4	3
	herbaceous understory	2	2
11B-9 Cedar Ridge	soil	5	4
	browse	5	4
	herbaceous understory	3	3

(1) = down, (2) = slightly down, (3) = stable, (4) = slightly up
(5) = up, est = site established, NR = site not read

Site No. and Name	Category	1994	2000
11B-10 Upper Little Park	soil	4	NR
	browse	5	NR
	herbaceous understory	1	NR
11B-11 Little Park Exclosure	soil	4	4
	browse	2	2
	herbaceous understory	3	4
11B-12 Williams Draw	soil	3	NR
	browse	3	NR
	herbaceous understory	3	NR
11B-14 Prickly Pear	soil	est	3
	browse	est	3
	herbaceous understory	est	2
11B-15 Twin Hollow	soil	est	4
	browse	est	3
	herbaceous understory	est	2
11B-16 Steer Ridge	soil	est	4
	browse	est	3
	herbaceous understory	est	3

(1) = down, (2) = slightly down, (3) = stable, (4) = slightly up
(5) = up, est = site established, NR = site not read